



DIMENSION ONE SPAS®

# Export Service Manual



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# Jet Pumps

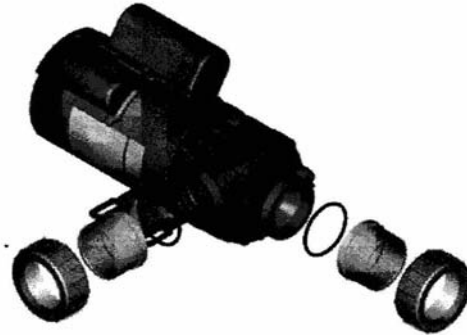
**DO NOT OPERATE THE PUMP IF THE SPA DOES NOT HAVE ENOUGH WATER IN IT.**

Water is both a coolant and a lubricant for the mechanical shaft seal. If the pump is run without water, the seal will be destroyed.

**THE PUMP IS EQUIPPED WITH AN AUTOMATIC THERMAL PROTECTION CIRCUIT. THE MOTOR WILL AUTOMATICALLY SHUT OFF BEFORE HEAT DAMAGE BUILD UP OCCURS.**

The pump will automatically reset itself when the temperature returns to a normal level. Keep the pump clean. Do not block air vents in the equipment door or pump. Air must circulate through the pump to keep it cool.

## PUMPS



**TURN OFF POWER BEFORE CHECKING MECHANICAL PROBLEMS. NEVER PROBE WITHIN THE MOTOR UNLESS YOU ARE SURE THAT THE POWER IS OFF.**

**If the pump fails to start and makes no sound, follow these steps to identify and resolve the problem:**

- 1) Verify that the circuit breaker is on.
- 2) Using a voltmeter, check for proper voltage coming through the breaker at the white terminal block in the control can.
- 3) Verify that fuses, breakers and connections are secure and operable.
- 4) If other items are on the same circuit as the spa, remove them. Running the spa on a dedicated circuit helps ensure that the spa gets proper voltage.
- 5) Check all electrical connections at the back of the pump underneath the cover.

**If the pump attempts to start but fails, follow these steps to identify and resolve the problem:**

- 1) Using a voltmeter, check the voltage at the output terminals on the PC board. Use the wiring diagram on the inside of the pack cover to determine which terminals to check. If the voltage is inadequate, check for loose connections, overloaded circuits, undersized wiring, or other reasons that voltage might drop.
- 2) Check all electrical connections at the pump.
- 3) Verify that the pump shaft is turning freely.

**If the pump has overheated and the thermal overload has tripped, follow these steps to identify and resolve the problem:**

- 1) Check the voltage to the pump line at the PC board terminals.
- 2) Check all electrical connections at the pump.
- 3) Using an ampmeter, compare the running amperage of the motor with the maximum full load amperage of the motor nameplate. If the amperage reading is higher than the full load rating, check for mechanical problems.
- 4) To determine the voltage used, check the pump connections against the pump wiring diagram on the nameplate.
- 5) Protect the motor from excess sunlight and other sources of additional heat.
- 6) If the spa is equipped with a fan, check it for proper operation.
- 7) Activate a pump. If the fan does not turn on within one minute, refer to the Fan Not Working section on page 62.

# Jet Pumps

**If the pump runs noisily, follow these steps to identify and resolve the problem:**

*NOTE: Air noise from the jet pump is normal because the motor has high rotational speed and requires adequate ventilation.*

- 1) Check the voltage at the input to the pump on the PC board. It should be within 10 percent of the pump nameplate specifications. If voltage is too high, verify input voltage to the PC board and contact an electrician.
- 2) Check the motor mounting base to ensure that the shipping fasteners have been removed.
- 3) Check that the plumbing lines are properly supported to prevent excess vibration.
- 4) Check for pump cavitation caused by something obstructing the suction line. Check the suction ports and the filter; remove anything that could obstruct water flow into the pump.

**If there is poor water flow into the pump, follow these steps to identify and resolve the problem:**

- 1) Check that all gate valves and jets are open and gate valve clips are in place.
- 2) Verify that the pump is filled with water. Prime the pump by opening the unions on the front of the pump and closing them after water starts leaking out. Make sure that water flow through the pump is unrestricted. A leaking seal will sometimes allow air into the pump housing and interfere with the priming of the pump.
- 3) Check pump operation without the filter to ensure that the filter is not restricting flow. Check that the suction drain and skimmer are free of debris. A clogged impeller may also restrict flow.
- 4) Check the voltage to the pump with a voltmeter. It should be within 10 percent of the pump nameplate specifications. If the voltage is too low, there is a problem with the incoming power. Check incoming voltage; if it is low, call an electrician.

**If the pump runs but does not pump water, follow these steps to identify and resolve the problem:**

- 1) Turn off the pump. Open the pump bleeder valve in the skimmer recess; this allows air to escape. Restart the pump; once the pump is running, close the bleeder valve.
- 2) If the problem persists, force water into the bleeder valve with a garden hose until the pump is primed.

# Selector Valve



Due to a number of factors, the selector valve may become difficult to turn. When a jet pump is on, the increased water pressure can make it more difficult to turn the valve. Other things, such as calcium deposits and foreign debris, may add to this problem.

**The following are preventative maintenance suggestions to help maintain selector valve performance:**

- 1) To prevent sand and debris from entering the spa, keep the spa cover on when the spa is not in use.
- 2) Users should rinse their feet before entering the spa.
- 3) Every time the spa is used or chemicals are added, turn the valve in both directions to break up any seal.
- 4) Use a sand sock on the drain cover.

**To remove sand, dirt or hard water calcium from the valve, clean it as follows:**

- 1) Carefully remove the selector valve knob.
- 2) Remove the knurled sealing cap. If you are unable to loosen the cap by hand, wrap a cloth over the cap and the surrounding shell and use pump pliers to remove it.  
*NOTE: Under the cap is an O-ring that must be put back in place when replacing the cap.*
- 3) Pull up the valve shaft to remove the valve barrel. Clean the barrel by scrubbing and removing all hair, dirt, and calcium buildup on the valve barrel, exposed O-rings, plastic washers and the valve itself.
- 4) To allow the valve to operate freely, the barrel may be lightly sanded.
- 5) Lubricate all O-rings with underwater lubricating grease and reassemble the valve.

# Wood Cabinet Care and Repair

Depending on the climate, wood cabinets should be restained every six months to help keep them in good condition.

**To remove blemishes and dirt, follow these steps:**

- 1) Using a medium grade steel wool or a paper towel with a small amount of paint thinner on it, rub the skirt in the direction of the wood grain.
- 2) Fill any cracks or holes with a similar color plastic wood filler. Allow it to dry per the directions on the wood filler label.
- 3) Sand the wood filler down in the direction of the wood grain until it is smooth and even with the existing surface.
- 4) Apply an exterior wood finish that has ultra-violet protection, fungus control and water repellency. Apply finish with a brush, sprayer or sponge. Allow the finish to soak into the wood for 15 minutes and then wipe it down with a lint-free rag.

**To replace the wood boards, follow these steps:**

- 1) With a hammer and chisel, remove the entire affected boards.
- 2) Dry fit the replacement board before securing in place.
- 3) Remove the new board and apply silicone to the back. Secure the board in place with wood staples that are fastened into the vertical braces behind the board.
- 4) Sand the board smooth; then, follow step 4 of the blemish removal instructions above.

# EnviroTect Cabinet Care and Repair

The EnviroTect skirt will not rot, splinter, cup, check or split. No staining or sealing is required to maintain its appearance.

To clean the EnviroTect skirt, use only baking soda and water, Apply with a clean sponge, rag or nylon-bristle brush.

*NOTE: The use of any other cleaning agent on the EnviroTect skirt may void the warranty.*

To repair a cut or scratch, use a razor blade to scrape away the plastic to a smooth, consistent finish.

## UltraLife Shell Repair

### REQUIRED MATERIALS

#### Crack Repair Kit

- 80-grit sandpaper
- Plastic putty knife
- Plastic welder epoxy (2)
- Plastic welder application gun
- Plastic welder mixing nozzles (3)
- Fiberglass mesh
- Acid brush

#### UltraLife Scratch & Gouge Repair Kit

- 120 and 220-grit sandpaper
- UltraLife chips
- Sponge rollers (3)
- Mixing lid
- Face mask
- Protective gloves
- Application sticks

#### Additional Materials

- Methyl Ethyl Ketone (MEK)
- Airtight container (metal or glass)
- Soft, clean cloth
- Masking tape
- Safety glasses
- Rotary buffer/sander
- Grinding tool or putty knife
- Measuring cup
- Spray bottle with 50/50 alcohol-water solution

#### Additional Materials (Crack Repair only)

- Scissors
- Drill and 1/4 inch bit
- Blue dye (available from D1)
- Caulking gun
- Large screwdriver or crowbar
- Can of spray foam

**CAUTION: Work in a well ventilated area. Wear safety glasses, gloves and a face mask.**

To repair a crack, start with step 1. To repair a gouge, start with step 7. To repair a scratch, start with step 9.

1) In an airtight container, mix 1/2 cup of UltraLife chips with two cups of MEK. The mixture should be smooth with no lumps and have the same consistency as enamel. *Allow the mixture to sit for at least 24 hours before using.* If the mixture is too thin, remove the lid and stir the mixture until it thickens to the desired consistency. If the mixture is too thick, add more MEK.

2) If the crack is not clearly visible, it may be necessary to dye the water to locate it. Empty one container of blue dye into the water. After 4 hours, the dye will settle in the cracked area of the spa. The blue water will also leak through to the foam underneath the spa and make it easier to locate the crack from beneath. Next, empty the water from the spa. Unplug the electrical and lift the spa onto one side. Be sure not to lean the spa to the side containing the equipment compartment. With a large screwdriver, remove the liner from the bottom of the spa. Look for the area on the foam that is either wet or blue.

3) Using a large screwdriver or crowbar, dig out the foam surrounding the cracked area. Be careful not to puncture the shell or the plumbing lines. Save the foam you dig out to use when refoaming. Clean an area approximately 8 cm beyond the width and length of the crack. Use the 80-grit sandpaper to remove the remaining foam sticking to the back of the shell.

4) Use a 1/4" drill bit to drill a hole at each end of the crack. The holes will prevent the shell from cracking further. After the holes are drilled, clean the area thoroughly. Move to the front side of the spa and place a piece of masking tape over the crack to prevent the plastic welder epoxy from seeping through.



# UltraLife Shell Repair

5) Cut a piece of fiberglass mesh large enough to cover at least 2" beyond the length and width of the crack. Squeeze a small amount of plastic welder epoxy into a rag to ensure that the epoxy is fully mixed. Slowly apply approximately 1/16" of epoxy to the back of the spa in the area to be covered with fiberglass mesh. Immediately lay the fiberglass mesh over the epoxy. Use the acid brush to work the epoxy into the fiberglass mesh. Repeat this process to add additional layers if the crack is large; wait 15 minutes between layers. After the last layer has dried, apply another coat of epoxy over the fiberglass and smooth out the entire area.

6) After the final layer of epoxy has dried, you will need to refoam the dug-out area. **It is very important to wear a face mask during this procedure.** Hold the can of spray foam and nozzle one foot away from the spa. Fill the cavity about 30% full with foam. The foam will expand and fill the cavity. The foam will be fully cured within two hours. Reattach the plastic liner to the bottom of the spa and set it right side up on the ground.

7) Use a cutting tool to round out a U-shaped cut the length of the crack/gouge. The channel should only be about 1/16" to 3/16" deep. Remove all loose particles and clean the area thoroughly.

8) First, outline the damaged area with strips of masking tape to protect the spa's surface. If repairing a crack or a gouge that has penetrated to the lower ABS layer, apply a small amount of plastic welder epoxy into the U-shaped cut. It is important to under fill the cut to leave room for the liquid UltraLife. Use an application stick to smooth out the welder epoxy and to get rid of as many air bubbles as possible. Wait 45-60 minutes for the welder epoxy to fully dry. After it has dried, use a grinding tool to remove excess epoxy. Then, slightly overfill the U-shaped cut with liquid UltraLife. Wait about 10 minutes for it to dry and remove the masking tape.

9) Start sanding with the 120-grit sandpaper. Be sure to sand in the same direction as the grain of the shell material. Sand an area slightly larger than the damaged area to prevent a channel from forming. Halfway through the sanding process, you will need to sand in a circular motion. Check the sanded surface every 15-20 seconds until the repaired area is even with the spa's surface. Switch to the 220-grit sandpaper and sand the area until the surface is smooth. Clean the area thoroughly with the alcohol-water solution to remove all loose particles.

10) Remove any debris on the foam rollers. Pour a small amount of the liquid UltraLife onto the mixing lid. Roll the outer half of the roller through the liquid UltraLife. Using a light, half dabbing and half rolling motion, roll the liquid ultraLife over the affected area. Be sure to roll with the grain of the shell to create the proper texture. Let the liquid UltraLife dry for 10 minutes before continuing.

11) Using the 220-grit sandpaper, very gently sand the area you applied the liquid UltraLife to. Be sure to sand with the grain of the shell material. Be careful not to apply too much pressure while sanding. Thoroughly clean the surface again when finished.

12) Roll the outer edge of a clean foam roller through the liquid UltraLife on the mixing lid. Using a rolling motion, apply a thin layer of the liquid UltraLife to the affected area. Let the liquid UltraLife dry for 10 minutes before continuing.

13) Using a clean foam roller, apply a light layer of MEK to the repaired area. Quickly apply the MEK over an area larger than the repaired area to restore the shine.



# Granitex Shell Repair

## REQUIRED MATERIALS

### Crack Repair Kit

- 80-grit sandpaper
- Plastic putty knife
- Plastic welder epoxy (2)
- Plastic welder application gun
- Plastic welder mixing nozzles (3)
- Fiberglass mesh
- Acid brush

### Granitex Scratch & Gouge Repair Kit

- Mixing cups, 1 oz
- Component A prefill
- Component A (Polymer matrix)
- Component B (Catalyst)
- Component C (Colored acrylic)
- 100, 120 and 220-grit sandpaper
- Plastic syringe
- Application sticks

### Additional Materials

- Safety glasses
- Soft, clean cloth
- Safety gloves
- Masking tape
- Grinding tool or putty knife
- Rotary buffer/sander
- Buffing/polish compounds
- Spray bottle with water and **non-citrus** dish soap
- Acid brush

### Additional Materials (Crack Repair only)

- Blue Dye (available from D1)
- Large screwdriver or crowbar
- Caulking gun
- Drill and 1/4" bit
- Scissors
- Can of spray foam

**CAUTION: Work in a well ventilated area. Wear safety glasses, gloves and a face mask.**

To repair a crack, start with step 1. To repair a gouge, start with step 7. To repair a scratch, start with step 9.

1) Check that component A and component C are marked with the same color number and match the color of the shell you are repairing. Use a plastic syringe to draw 8.5 cc of Component A. In an airtight container, add one container of component C and the 8.5 cc of Part A. Let this mixture sit for one hour. Shake component B thoroughly and add 18 drops to the mixture. Stir this mixture for about 30 seconds.

2) If the crack is not clearly visible, it may be necessary to dye the water to locate it. Empty one container of blue dye into the water. After 4 hours, the dye will settle in the cracked area of the spa. The blue water will also leak through to the foam underneath the spa and make it easier to locate the crack from beneath. Next, empty the water from the spa. Unplug the electrical and lift the spa onto one side. Be sure not to lean the spa to the side containing the equipment compartment. With a large screwdriver, remove the liner from the bottom of the spa. Look for the area on the foam that is either wet or blue.

3) Using a large screwdriver or crowbar, dig out the foam surrounding the cracked area. Be careful not to puncture the shell or the plumbing lines. Save the foam you dig out to use when refoaming. Clean an area approximately 8 cm beyond the width and length of the crack. Use the 80-grit sandpaper to remove the remaining foam sticking to the back of the shell.

4) Use a 1/4" drill bit to drill a hole at each end of the crack. The holes will prevent the shell from cracking further. After the holes are drilled, clean the area thoroughly. Move to the front side of the spa and place a piece of masking tape over the crack to prevent the plastic welder epoxy from seeping through.

# Granitex Shell Repair

5) Cut a piece of fiberglass mesh large enough to cover at least 5 cm beyond the length and width of the crack. Squeeze a small amount of plastic welder epoxy into a rag to ensure that the epoxy is fully mixed. Slowly apply approximately 0.25 cm of epoxy to the back of the spa in the area to be covered with fiberglass mesh. Immediately lay the fiberglass mesh over the epoxy. Use the acid brush to work the epoxy into the fiberglass mesh. Repeat this process to add additional layers if the crack is large; wait 15 minutes between layers. After the last layer has dried, apply another coat of epoxy over the fiberglass and smooth out the entire area.

6) After the final layer of epoxy has dried, you will need to refoam the dug-out area. **It is very important to wear a face mask during this procedure.** Hold the can of spray foam and nozzle one foot away from the spa. Fill the cavity about 30% full with foam. The foam will expand and fill the cavity. The foam will be fully cured within two hours. Reattach the plastic liner to the bottom of the spa and set it right side up on the ground.

7) Use a cutting tool to round out a U-shaped cut the length of the crack/gouge. The channel should be between 0.25 cm and 0.5 cm deep. Remove all loose particles and clean the area thoroughly.

8) First, outline the damaged area with strips of masking tape to protect the spa's surface. If repairing a crack or a gouge that has penetrated to the lower ABS layer, apply a small amount of component A prefill into the U-shaped cut. It is important to underfill the cut to leave room for the Granitex mixture. Use an application stick to smooth out the prefill and to get rid of as many air bubbles as possible. Wait 7-12 minutes for the prefill to fully dry. After it has dried, use a grinding tool to remove any excess. Then, slightly overfill the U-shaped cut with Granitex filling mixture. Wait about 1 hour for it to dry and remove the masking tape.

9) Start sanding with the 100-grit sandpaper. Sand an area slightly larger than the damaged area to prevent a channel from forming. Next, sand with the 120-grit sandpaper. Check the sanded surface every 15-20 seconds until the repaired area is even with the spa's surface. Switch to the 220-grit sandpaper. Do not sand the area until it is smooth; make sure that a texture remains. Clean the area thoroughly to remove all loose particles.

10) After sanding, the repaired area can be blended with the texture of the surrounding surface by adding the Granitex™ filling mixture with an acid brush. It is important to stipple on small amounts. The stippling will give the repaired area depth and texture, which will help it blend with the rest of the shell. Allow about 30 minutes for the repair to fully dry. Once the mixture has dried, sand the area lightly with soapy water and the 220-grit sandpaper to remove any significant protrusions.

11) Using a buffing pad, apply a small amount of buffing compound or polish to the repaired area. Apply until the surface is shiny. Use a soft cloth to remove any excess polish.

# Acrylic Shell Repair

## REQUIRED MATERIALS

### Crack Repair Kit

- 80-grit sandpaper
- Plastic putty knife
- Plastic welder epoxy (2)
- Plastic welder application gun
- Plastic welder mixing nozzles (3)
- Fiberglass mesh
- Acid brush

### Acrylic Crack & Gouge Repair Kit

- White toner
- Black toner
- Catalyst
- Poly paste
- Mixing cups (3)
- Application sticks
- Protective gloves

### Acrylic Scratch Repair Kit

- 220-grit sandpaper
- #15 Mic sanding pad (grey)
- #9 Mic sanding pad (blue)
- #3 Mic sanding pad (pink)
- Soft buffing pads (light blue)
- Buffing compound

### Additional Materials

- Safety glasses
- Soft, clean cloth
- Masking tape
- Grinding tool or putty knife
- Rotary buffer/sander
- Spray bottle with water and **non-citrus** dish soap

### Additional Materials (Crack Repair only)

- Blue Dye (available from D1)
- Large screwdriver or crowbar
- Caulking gun
- Drill and 1/4" bit
- Scissors
- Can of spray foam

## CAUTION: Work in a well ventilated area. Wear safety glasses, gloves and a face mask.

To repair a crack, start with step 1. To repair a gouge, start with step 6. To repair a scratch, start with step 9.

- 1) If the crack is not clearly visible, it may be necessary to dye the water to locate it. Empty one container of blue dye into the water. After 4 hours, the dye will settle in the cracked area of the spa. The blue water will also leak through to the foam underneath the spa and make it easier to locate the crack from beneath. Next, empty the water from the spa. Unplug the electrical and lift the spa onto one side. Be sure not to lean the spa to the side containing the equipment compartment. With a large screwdriver, remove the liner from the bottom of the spa. Look for the area on the foam that is either wet or blue.
- 2) Using a large screwdriver or crowbar, dig out the foam surrounding the cracked area. Be careful not to puncture the shell or the plumbing lines. Save the foam you dig out to use when refoaming. Clean an area approximately 8 cm beyond the width and length of the crack. Use the 80-grit sandpaper to remove the remaining foam sticking to the back of the shell.
- 3) Use a 1/4" drill bit to drill a hole at each end of the crack. The holes will prevent the shell from cracking further. After the holes are drilled, clean the area thoroughly. Move to the front side of the spa and place a piece of masking tape over the crack to prevent the plastic welder epoxy from seeping through.
- 4) Cut a piece of fiberglass mesh large enough to cover at least 5 cm beyond the length and width of the crack. Squeeze a small amount of plastic welder epoxy into a rag to ensure that the epoxy is fully mixed. Slowly apply approximately 0.25 cm of epoxy to the back of the spa in the area to be covered with fiberglass mesh. Immediately lay the fiberglass mesh over the epoxy. Use the acid brush to work the epoxy into the fiberglass mesh. Repeat this process to add additional layers if the crack is large; wait 15 minutes between layers. After the last layer has dried, apply another coat of epoxy over the fiberglass and smooth out the entire area.

# Acrylic Shell Repair

- 5) After the final layer of epoxy has dried, you will need to refoam the dug-out area. **It is very important to wear a face mask during this procedure.** Hold the can of spray foam and nozzle one foot away from the spa. Fill the cavity about 30% full with foam. The foam will expand and fill the cavity. The foam will be fully cured within two hours. Reattach the plastic liner to the bottom of the spa and set it right side up on the ground.
- 6) Use a cutting tool to round out a U-shaped cut the length of the crack/gouge. The channel should be between 0.25 cm and 0.5 cm deep. Remove all loose particles and clean the area thoroughly.
- 7) If the color of the poly paste needs to be adjusted to match the spa color, dispense ½ ounce of poly paste into a mixing cup. Then, add about 16 drops of catalyst for every ½ ounce of poly paste. Now, add about 1 to 3 drops of white or black toner and mix all items together thoroughly. The amount of white or black toner added depends on where the damaged area is located. The color will need to be adjusted to match the various parts of the Acrylic shell. The deeper in the spa the lighter the color needs to be.
- 8) First, outline the damaged area with strips of masking tape to protect the spa's surface. If repairing a crack or a gouge that has penetrated to the lower ABS layer, apply a small amount of plastic welder epoxy into the U-shaped cut. It is important to underfill the cut to leave room for the Acrylic filling mixture. Use an application stick to smooth out the pre-fill and to get rid of as many air bubbles as possible. Wait 45-60 minutes for the epoxy to fully dry. After it has dried, use a grinding tool to remove any excess. Then, slightly overfill the U-shaped cut with Acrylic filling mixture. As the mixture dries, it may shrink, requiring the application of additional filling mixture. *NOTE: It may take up to 24 hours for the mixture to dry completely.*
- 9) Use the 220-grit sanding pad on the dry surface. Sand in a circular motion until the damaged area is even with the spa's surface. Be sure to sand a larger area to prevent a channel from forming. Then, soak the area thoroughly with soapy water and sand with the #15 sanding pad. You should check the sanded surface every 15 to 20 seconds while sanding. The surface will not be completely smooth with the first two sanding pads. After the surface starts to feel smoother, change to the #9 sanding pad. Be sure to keep sanding area wet with soapy water. Switch to the #3 sanding pad when finished with the #9 pad.
- 10) Using a buffing pad, apply a small amount of buffing compound or polish to the repaired area. Apply until the surface is shiny. Use a soft cloth to remove any excess polish.

# Optimount Removal

To remove an Optimount, follow these instructions:

- 1) Dig out the OptiMount that needs to be replaced.
- 2) Loosen and remove the nuts on the underside of the shell.
- 3) Remove the OptiMount. Use a hammer to pound the OptiMount free if necessary.
- 4) Clean the surface area around the Optimount holes with a non-abrasive cleaner to ensure that the new OptiMount will seal correctly.

# Optimount Installation



1) The OptiMount will install through the drill holes in the plastic front side of the spa shell.



2) Place the gasket onto the mount as shown and align the holes.



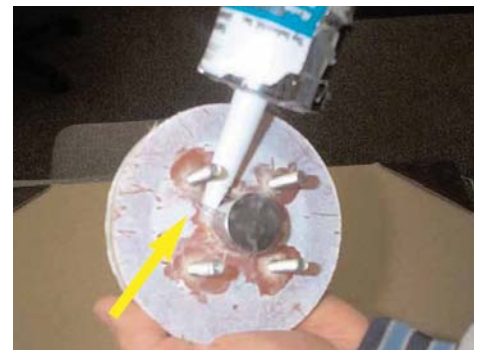
3) Align the OptiMount and gasket with the screw holes. Press the OptiMount through the center hole.



4) Align the holes in the OptiMount, gasket and shell. Completely fill the holes with silicone.



5) Insert the 4 screws through the OptiMount holes.



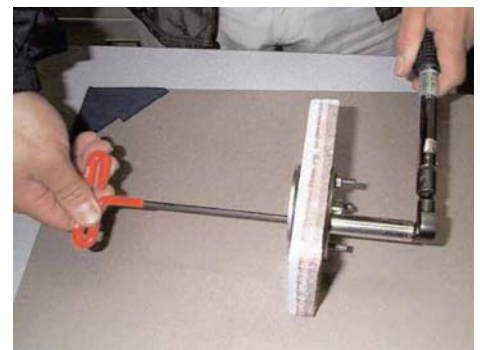
6) Put a bead of silicone around the hole next to the OptiMount post on the fiberglass side.



7) Align the screws with the holes and slide the washer through the screws.



8) Hand tighten the nuts in a cross pattern as indicated at right.



9) With one hand, hold the screw with a 1/8" Allen wrench. With the other, tighten the nut to 35lbs/in with a 7/16" socket. Follow the same pattern used in step 8.

# Plumbing Leak Repair

## REQUIRED MATERIALS

- Hacksaw
- PVC cutting tool or tree saw
- Wire saw
- PVC glue
- 110-grit sandpaper
- Blue dye (available from D1)

## REPAIR INSTRUCTIONS

*NOTE: It is normal to lose a few centimeters of water over a given period of time due to evaporation. It is best to mark the proper water level and check periodically for water loss.*

- 1) Remove all filters and add one container of blue dye into the water. **Do not use clothing dye in the spa.**
- 2) Turn the pumps on and let the spa run for at least two hours. Make sure that the selector valve is set to a central position to allow the dye to circulate through all plumbing lines.
- 3) Turn the power off and disconnect the incoming electrical lines. Empty the water from the spa. Unplug the electrical and lift the spa onto one side. Be sure not to lean the spa to the side containing the equipment compartment. With a large screwdriver, remove the liner from the bottom of the spa. Look for the area on the foam that is either wet or blue.
- 4) Using a large screwdriver or crowbar, dig out the foam surrounding the leak. Be careful not to puncture the shell or the plumbing lines. Save the foam you dig out to use when refoaming.
- 5) Once the problem is detected, remove all foam from around the area needing repair. Clear out enough space so you can work safely.

*NOTE: If the leak is caused by something other than a plumbing line, i.e. a cracked filter canister, contact D1 service.*

- 6) Photograph the area you are repairing. This will give you a makeshift schematic of the plumbing that you will remove.
- 7) Remove the leaking piece of plumbing line. Clean the excess foam residue from the cut plumbing line to ensure that the glue will hold properly. Use 110-grit sandpaper to clean the foam off the cut plumbing line at least 8 cm away from the cut in each direction.
- 8) Cut the new plumbing line and dry fit it to the spa. If it fits properly, assemble the plumbing lines in place using a liberal amount of glue. Hold each joint together for a few minutes to make sure the glue joints hold.
- 9) Lay the spa back down and refill it. Run the jet pumps and watch for any visible signs of leakage. If you see no signs of a leak, drain the spa and set it back on its side.
- 10) **It is very important to wear a face mask during this procedure.** Hold the can of spray foam and nozzle one foot away from the spa. Fill the cavity about 30% full with foam. The foam will expand and fill the cavity. The foam will be fully cured within two hours. Reattach the plastic liner to the bottom of the spa and set it right side up on the ground.





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Upper/Auxiliary Control Does Not Work.....	63
Fan Does Not Work.....	64
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Massage Sequencer Does Not Work.....	68
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\* Please note that this only applies to AFS models since 2008 with Bay Packs.

# mDrive Tech Menu

On spas equipped with the M-Drive Control Panel, there is a tech menu containing functions that the customer does not have access to. To get to this menu, hold the center key on the 5-Key Context Keypad for at least 5 seconds; this will put the spa in Standby Mode. Continue holding the center key for at least 5 more seconds to enter the Tech Menu.

The functions described below are available through the Tech Menu. To access a function, simply push the selection button next to the function.

## **Dealer Information**

The Dealer Information function allows a dealer to enter its contact information; this information is displayed when certain service reminders and error messages are displayed.

Push the button next to Dealer Info to bring up the Dealer Info menu. From here, push the button next to Name or Phone to edit that information. Use the left and right keys on the 5-Key Context Keypad to move between characters; use the up and down arrows on the 5-Key Context Keypad to select a letter or number to display. When done, push the Done button to save your changes.

## **Error Log**

Push the button next to Error Log to bring up the Error Log screen. This screen allows you to look through the spa's error history to review past problems. The errors will be displayed in a list format; use the up and down arrows on the 5-Key Context Keypad to scroll through the list. To clear the error log, press the Clear All button. When done viewing the log, press the Back button.

## **Last Item Started**

Push the button next to Last Started to show the last accessory the spa started. This can be useful in determining the source of certain intermittent problems.

## **Screen Test**

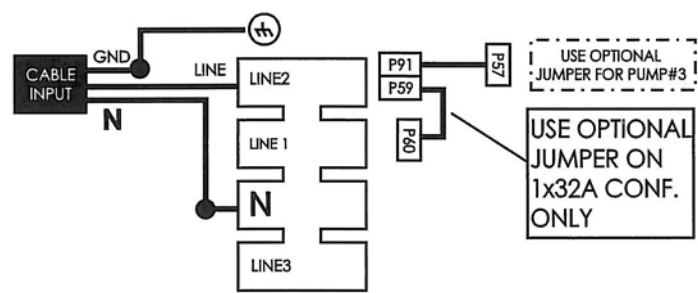
Push the button next to Screen Test to run an LCD screen test. In sequence, the screen will display moving vertical bars, moving horizontal bars, and a flashing screen. To exit the test sequence, press any button.

## **Demo**

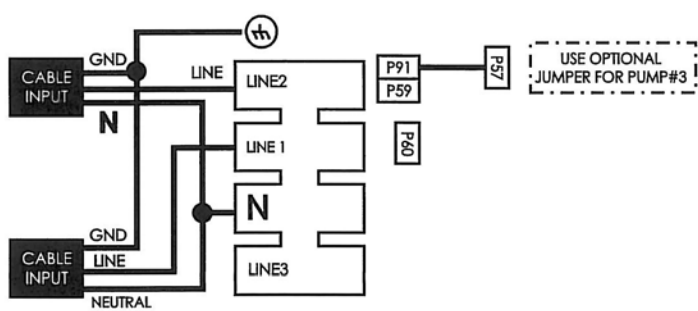
Push the button next to Demo to show an error message for demonstration purposes. The demo error will show the dealer's contact info, just as a real error message would. To scroll between the different errors, use the left and right arrows on the 5-Key Context Keypad. To exit the demo, press Back or Snooze.

# Electrical Wiring

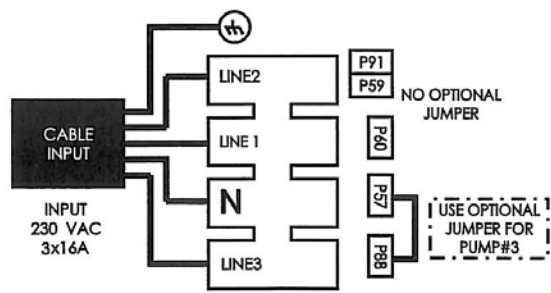
1 x 230 VAC (1x32 A) input supply wiring



Not available in Australia and New Zealand  
230 VAC 2 phases (2 x 16A) taken from 3-phase network



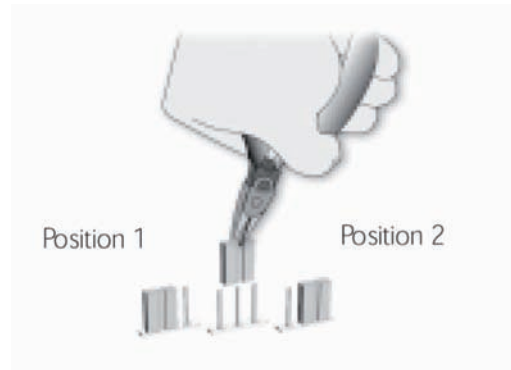
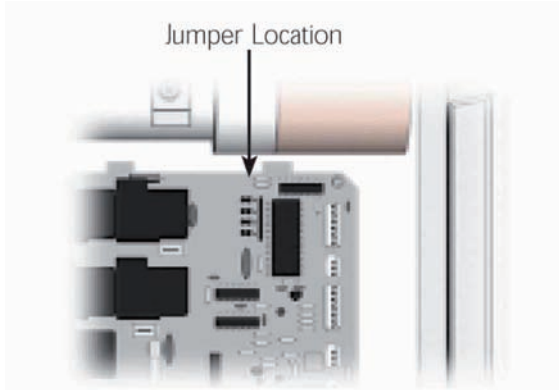
Input supply wiring  
230 VAC 3-phase (3 x 16A)



# Jumper Settings - MSPA-1

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

To access the jumpers, first remove the lower control can cover. Jumper functions may change throughout the years. Packs' jumper functions are detailed on the wiring diagram on the back of the control can lid.



1) The jumpers are located in the upper right section of the PC board.

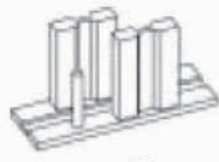
2) Turn the spa off before modifying jumper settings. Pull the jumper out, replace it in the desired position, and turn the spa back on.

## MSPA-1

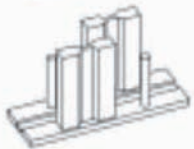
Jumpers 1 and 2: Breaker rating configuration. This information is used by the Smart Heat Control feature.



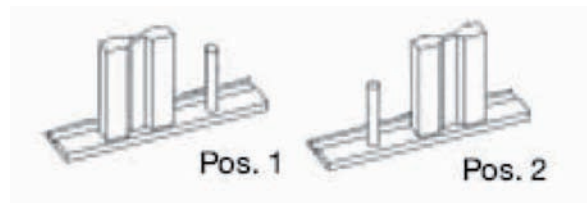
2x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 1



1x32 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 2



1x16 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 1



Jumper 3: Ultra Pure

Position 1: Ultra Pure (all Bay Collection spas, all Reflections spas except Arena)

Position 2: No Ultra Pure (Arena)

Jumper 4: Circulation pump

Position 1: Circulation pump (All Ultra Pure spas and non-Ultra Pure spas with CZWMS)

Position 2: No circulation pump

If you replace the PC board, please refer to its diagram (which is delivered with the PC board)

# Jumper Settings - MSPA-MP-D11-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D11-CE

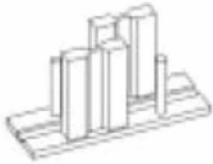
Jumper 1 and 2: Breaker rating configuration



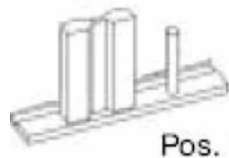
1x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 1



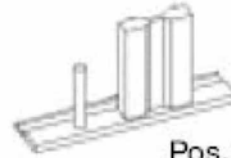
2x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 2



1x32 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 1



Pos. 1



Pos. 2

Jumper 3: Ultra Pure

Position 1: Ultra Pure (all Reflections spas except Arena)  
Position 2: No Ultra Pure (Arena)

Jumper 4: Circulation pump

Position 1: Circulation pump (All Ultra Pure spas and non-Ultra Pure spas with CZWMS)  
Position 2: No circulation pump

Jumper 5: Dynamic light

Position 1: Dynamic light installed  
Position 2: Dynamic light not installed

Jumper 6: Pump 2

Position 1: Pump 2 installed  
Position 2: Pump 2 not installed

Jumper 7: Pump 1

Position 1: Pump 1 Single speed  
Position 2: Pump 1 Dual speed

Jumper 8: Pump 2

Position 1: Single speed  
Position 2: Dual speed

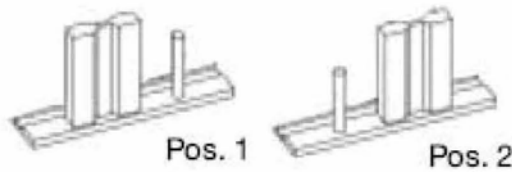
**NOTE: Enabling step mode automatically selects the UltraPure configuration, regardless of JMP3 position. If UltraPure is selected, there is always a circulation pump, regardless of JMP4 position.**

If you replace the PC board, please refer to its diagram (which is delivered with the PC board)

# Jumper Settings - MSPA-MP-D12-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D12-CE



Jumpers 1 & 2: Breaker rating configuration

2x16 Amp Circuit

Jumper 1: Position 1

Jumper 2: Position 2

1x32 Amp Circuit

Jumper 1: Position 1

Jumper 2: Position 1

3x16 Amp Circuit

Jumper 1: Position 2

Jumper 2: Position 2

Jumper 6,7,8, not used

Jumper 3: Waterfall

Position 1: Waterfall installed

Position 2: Waterfall not installed

Jumper 4: Pump 3

Position 1: Pump 3 installed

Position 2: Pump 3 not installed (Dupree Bay)

Jumper 5: Dynamic lighting

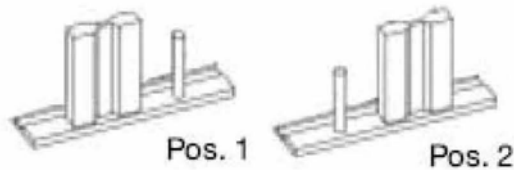
Position 1: Dynamic lighting installed

Position 2: Dynamic lighting not installed

# Jumper Settings - MSPA-MP-D14-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D14-CE



Jumpers 1 & 2: Breaker rating configuration

2x16 Amp Circuit

Jumper 1: Position 1

Jumper 2: Position 2

1x32 Amp Circuit

Jumper 1: Position 2

Jumper 2: Position 1

3x16 Amp Circuit

Jumper 1: Position 2

Jumper 2: Position 2

Jumper 6,7,8, not used

Jumper 3: Waterfall

Position 1: Waterfall installed

Position 2: Waterfall not installed

Jumper 4: Pump 3

Position 1: Pump 3 installed

Position 2: Pump 3 not installed (Dupree Bay)

Jumper 5: Dynamic lighting

Position 1: Dynamic lighting installed

Position 2: Dynamic lighting not installed

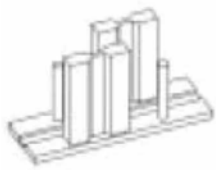
If you replace the PC board, please refer to its diagram (which is delivered with the PC board)

# Jumper Settings - MSPA-MP-D15-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D15-CE

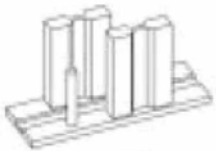
### Jumper 1 and 2: Breaker rating configuration



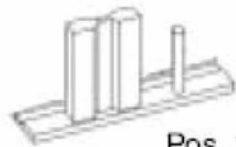
1x32 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 1



3x16 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 2



2x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 2



Pos. 1



Pos. 2

### Jumper 3: Heat method

Position 1: Heat with CP

Position 2: Heat with pump 1

### Jumper 4 and 5: Pump configuration



Pumps 2 and 3 not installed  
Jumper 4: Position 1  
Jumper 5: Position 1



Pump 2 single speed,  
pump 3 not installed  
Jumper 4: Position 1  
Jumper 5: Position 2



Pumps 2 and 3 single speed  
Jumper 4: Position 2  
Jumper 5: Position 1



Pump 2 dual speed,  
pump 3 not installed  
Jumper 4: Position 2  
Jumper 5: Position 2

### Jumper 6: Waterfall

Position 1: Waterfall installed

Position 2: Waterfall not installed

### Jumper 7: Dynamic light

Position 1: Dynamic light installed

Position 2: Dynamic light not installed

### Jumper 8: Heater management

Position 1: Heater management enabled

Position 2: Heater management disabled

If you replace the PC board, please refer to its diagram (which is delivered with the PC board)



# Jumper Settings - MSPA-MP-D17-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D17-CE

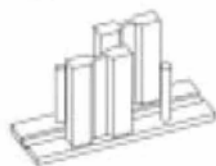
Jumper 1 and 2: Breaker rating configuration



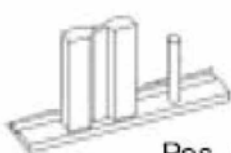
1x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 1



2x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 2



1x32 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 1



Pos. 1



Pos. 2

Jumper 3: Ultra Pure  
Position 1: Ultra Pure  
Position 2: No Ultra Pure

Jumper 4: Circulation pump  
Position 1: Circulation pump installed  
Position 2: Not installed

Jumper 5: Dynamic light  
Position 1: With Dynamic light  
Position 2: Without Dynamic light

Jumper 6: Pump 2  
Position 1: Pump 2 installed  
Position 2: Pump 2 not installed

Jumper 7: Pump 1  
Position 1: Single speed  
Position 2: Dual speed

Jumper 8: Pump 2  
Position 1: Single speed  
Position 2: Dual speed

If you replace the PC board, please refer to its diagram (which is delivered with the PC board)

# Jumper Settings - MSPA-MP-D18-CE

It is possible to change some parameters of a spa pack by positioning specific jumpers located on the PC board.

## MSPA-MP-D18-CE

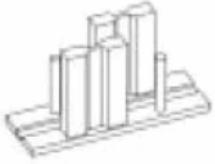
Jumper 1 and 2: Breaker rating configuration



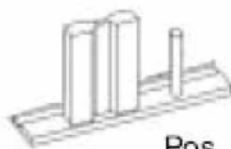
1X16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 1



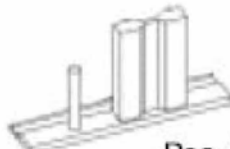
2x16 Amp Circuit  
Jumper 1: Position 1  
Jumper 2: Position 2



1x32 Amp Circuit  
Jumper 1: Position 2  
Jumper 2: Position 1



Pos. 1



Pos. 2

Jumper 3: Ultra Pure  
Position 1: Ultra Pure  
Position 2: No Ultra Pure

Jumper 4: Circulation pump  
Position 1: Circulation pump installed  
Position 2: Not installed

Jumper 5: Dynamic light  
Position 1: Installed  
Position 2: Not installed

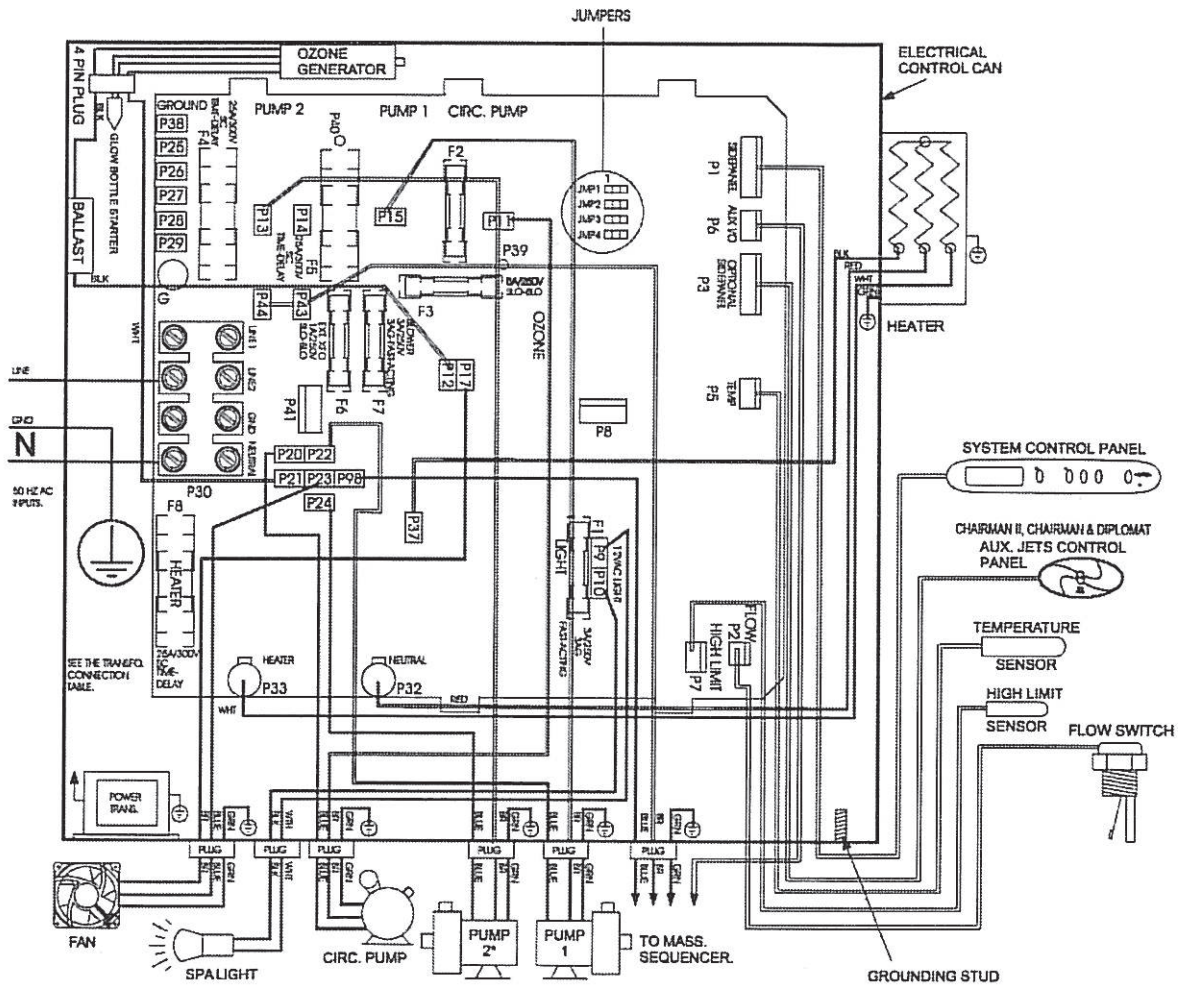
Jumper 6: Pump 2  
Position 1: Pump 2 installed  
Position 2: Pump 2 not installed

Jumper 7: Pump speed  
Position 1: Pump 1 & pump 2 single speed  
Position 2: Pump 1 & pump 2 dual speed

Jumper 8: Water feature  
Position 1: Water feature installed  
Position 2: No water feature installed

If you replace the PC board, please refer to its diagram (which is delivered with the PC board)

# Wiring Diagram - MAS-MSPA-1-CE



## Fan

<u>Voltage</u>	230V
Blue / Com	P23
Brown / Line	P17
Green / Ground	⏏

## Heater

<u>Voltage</u>	230V
White	P33
Black / Com	P37
Red/Neutral	P32
Green / Ground	⏏

## Pump

<u>Voltage</u>	230V
Blue / Com	P22
Brown / High Speed	P15
Green / Ground	⏏

## Pump 1 Pump 2

<u>230V</u>	<u>230V</u>
P22	P24
P15	P13
⏏	⏏

## Circ. Pump

<u>Voltage</u>	230V
Blue / Com	P20
Brown / Line	P11
Green / Ground	⏏

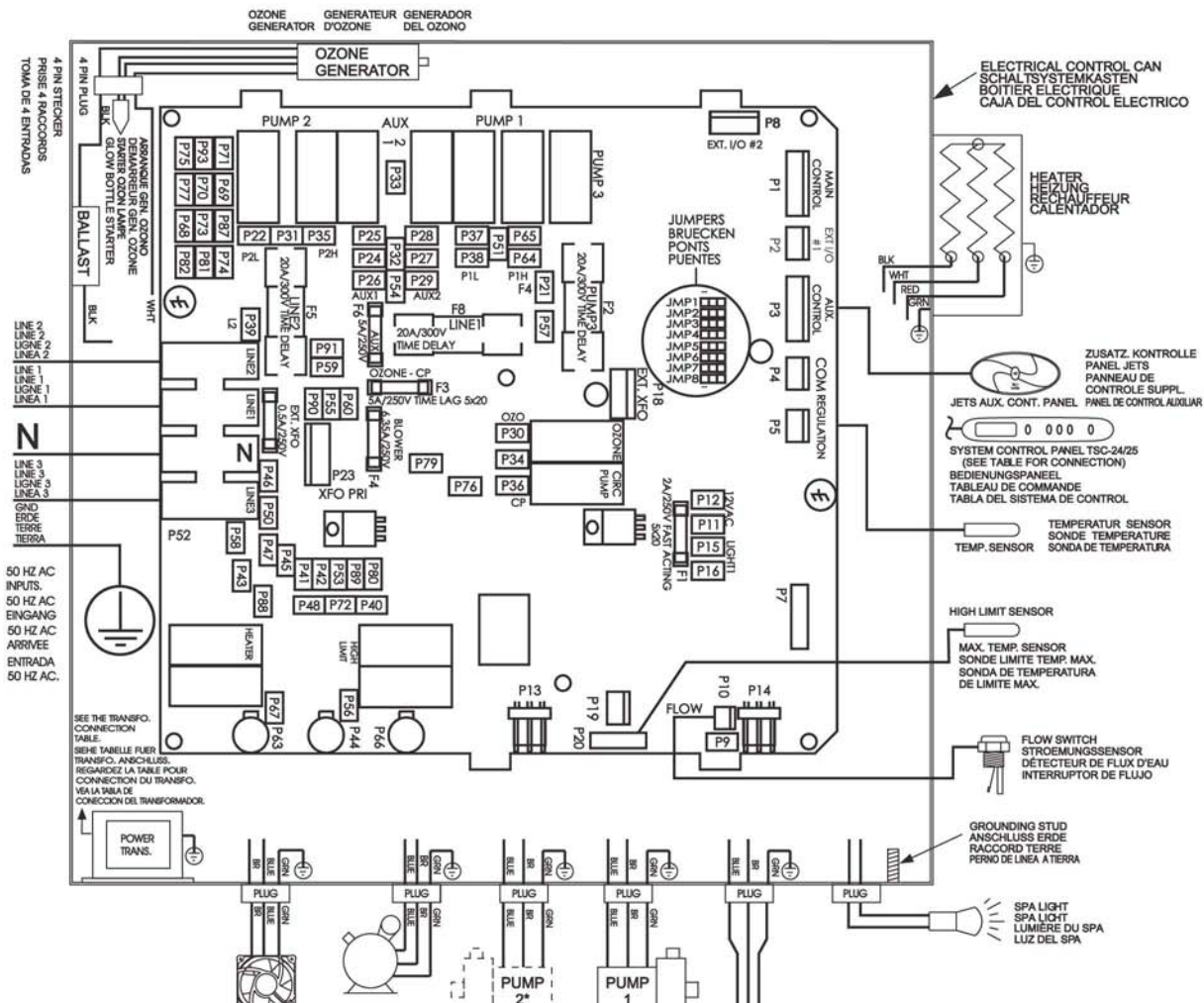
## Ozone

<u>Voltage</u>	230V
White / Com	P21
Black / Line	P12
Green / Ground	⏏

## Light

<u>Voltage</u>	12V
White / 0 VAC	P9
Black / 12 VAC	P10

# Wiring Diagram - MAS-MSPA-MP-D11-CE



## Fan

Voltage	230V
Blue / Com	P53
Brown / Line	P24
Green / 0 VAC	

## Ozone Generator

Voltage	230V
White / Com	P46
Black / Line	P30
Green / 0 VAC	

## Mass. Sequencer

Voltage	230V
Blue / Com	P47
Brown / Line	P34
Green / 0 VAC	

## Pump

Voltage	230V
Blue / Com	P48
Brown / High Speed	P64
Green / Ground	

## Pump 1 Pump 2

Voltage	230V
Blue / Com	P45
Brown / High Speed	P35
Green / Ground	

## Circulation Pump

Voltage	230V
Blue / Com	P41
Brown / Line	P36
Green / 0 VAC	

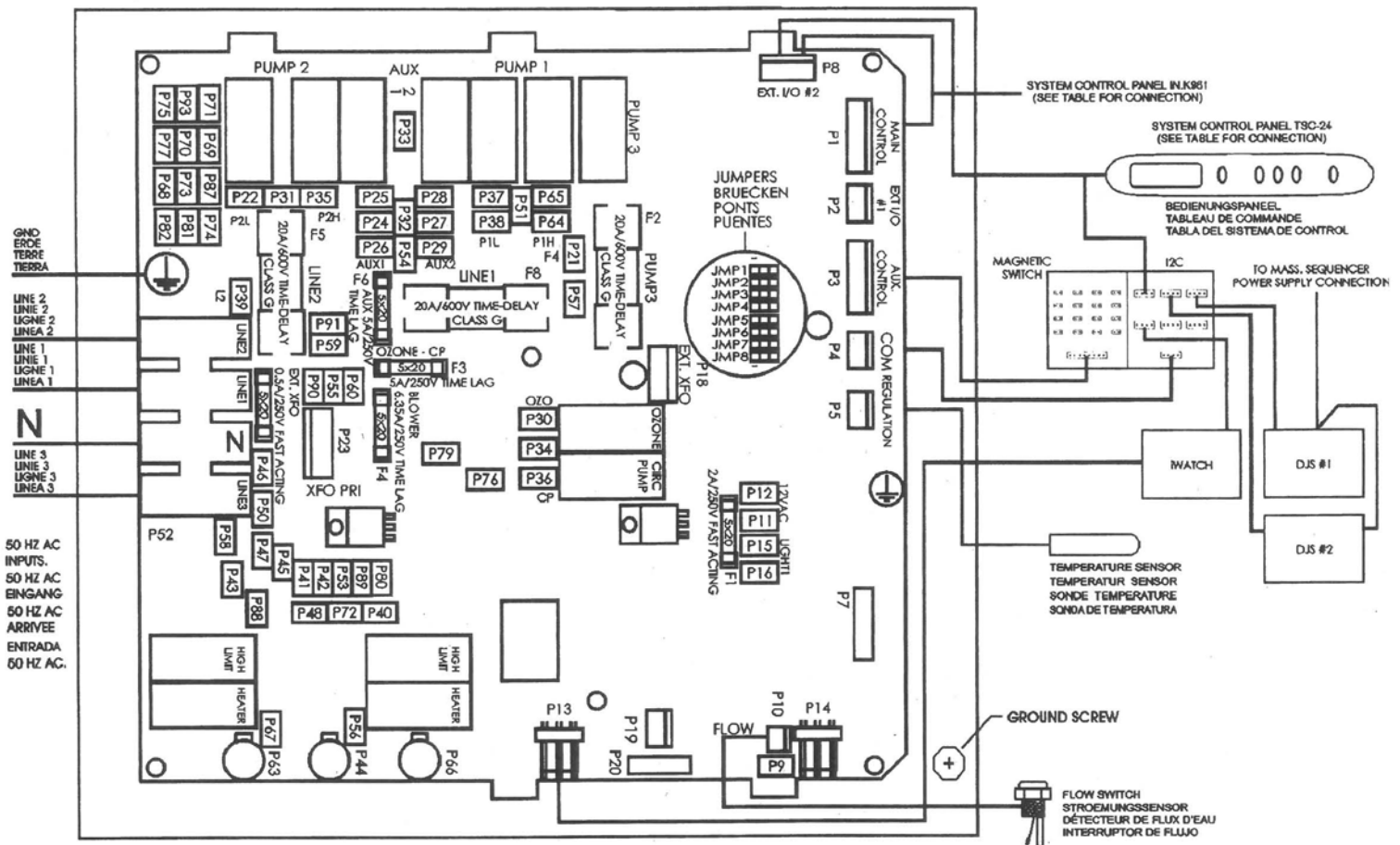
## Heater - 1x16A, 2x16A, 1x32A

Voltage	230V
Br & Blk or Red & Blk	P63
Blue or White	P66
Green	P77

## Other Components

Upper control, TSC-24-D13	P4	High limit sensor	P20
Upper control, TSC-25	P1	Temperature sensor	P5
Aux. control, TSC-17	P3	Flow switch	P10
DJS-1	P4	Light	P14

# Wiring Diagram - MAS-MSPA-MP-D15-CE



**Fan**  
 Voltage 230V  
 Blue / Neutral P53  
 Brown / Line P24  
 Green / Ground P81

**Waterfall**  
 Voltage 230V  
 Blue / Neutral P50  
 Brown / Line P27  
 Green / Ground P74

**Ozone Generator**  
 Voltage 230V  
 Blue / Neutral P46  
 Brown / Line P30  
 Green / Ground P87

**Circulation Pump**  
 Voltage 230V  
 Blue / Com P41  
 Brown / Line P36  
 Green / Ground P68

**Pump**  
 Voltage 230V  
 Blue / Com P48  
 Brown / High Speed P64  
 Black / Low Speed P38  
 Green / Ground P71

	Pump 1	Pump 2	Pump 3
Voltage	230V	230V	230V
Blue / Com	P48	P45	P40
Brown / High Speed	P64	P35	P21
Black / Low Speed	P38	N/A	N/A
Green / Ground	P71	P93	P75

**Mass. Sequencer #1**  
 Voltage 230V  
 Blue / Com P47  
 Brown / Line P34  
 Green / Ground P77

**Heater 1 x 32 amp.**  
 Voltage 230V  
 Blue P66  
 Brown & Black P63  
 Green

**Mass. Sequencer #2 (Sarena Bay only)**  
 Blue P80  
 Brown P54  
 Green / Ground P69

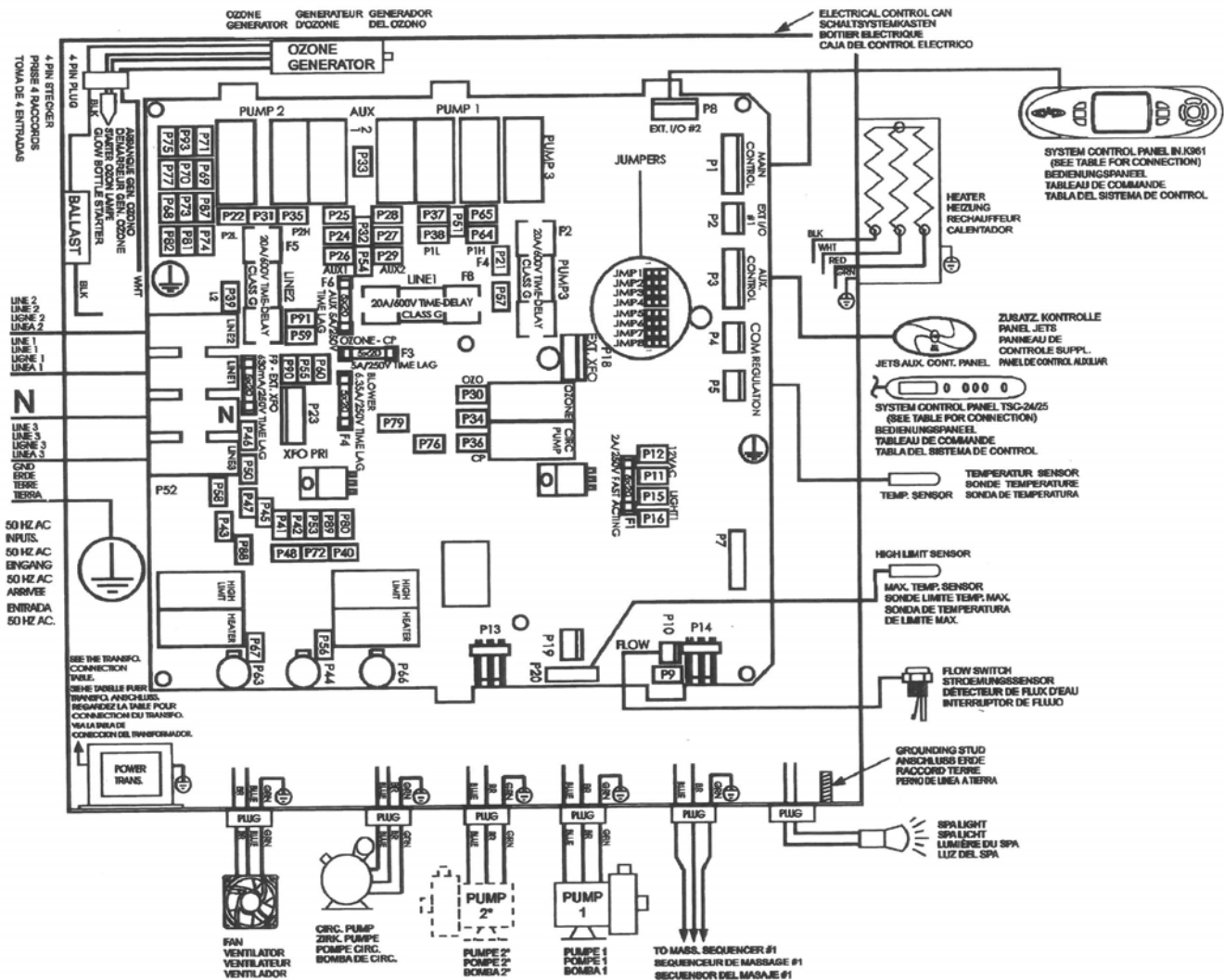
**Heater 3x16 amp.**  
 Blue P66  
 Brown P63  
 Black P44  
 Green / Ground

## Other Components

Upper control, TSC-24 - D13	P4&P8	High limit sensor	P78	iWatch	P4
Upper control, M-Drive	P1&P8	Temperature sensor	P5	iWatch power connect	P13
Magnetic switch board	P3	Flow switch	P10	IR receiver	P8
DJS-2	P4	Light	P14		



# Wiring Diagram - MAS-MSPA-MP-D17-CE



## Fan

Voltage	230V
Blue / Neutral	P53
Brown / Line	P24
Green / Ground	⏏

## Transformer

Voltage	230V
5-pin, org/wht	P23
4-pin, yel/blu/red	P18

## Ozone Generator

Voltage	230V
White / Neutral	P46
Brown / Line	P30
Green / Ground	⏏

## Mass. Sequencer

Voltage	230V
Blue / Com	P47
Brown / Line	P34
Green / Ground	⏏

## Pump

Voltage	230V
Blue / Com	P48
Brown / High Speed	P64
Green / Ground	⏏

## Pump 1 Pump 2

Voltage	230V
Blue / Com	P45
Brown / High Speed	P35
Green / Ground	⏏

## Circulation Pump

Voltage	230V
Blue / Com	P41
Brown / Line	P36
Green / Ground	⏏

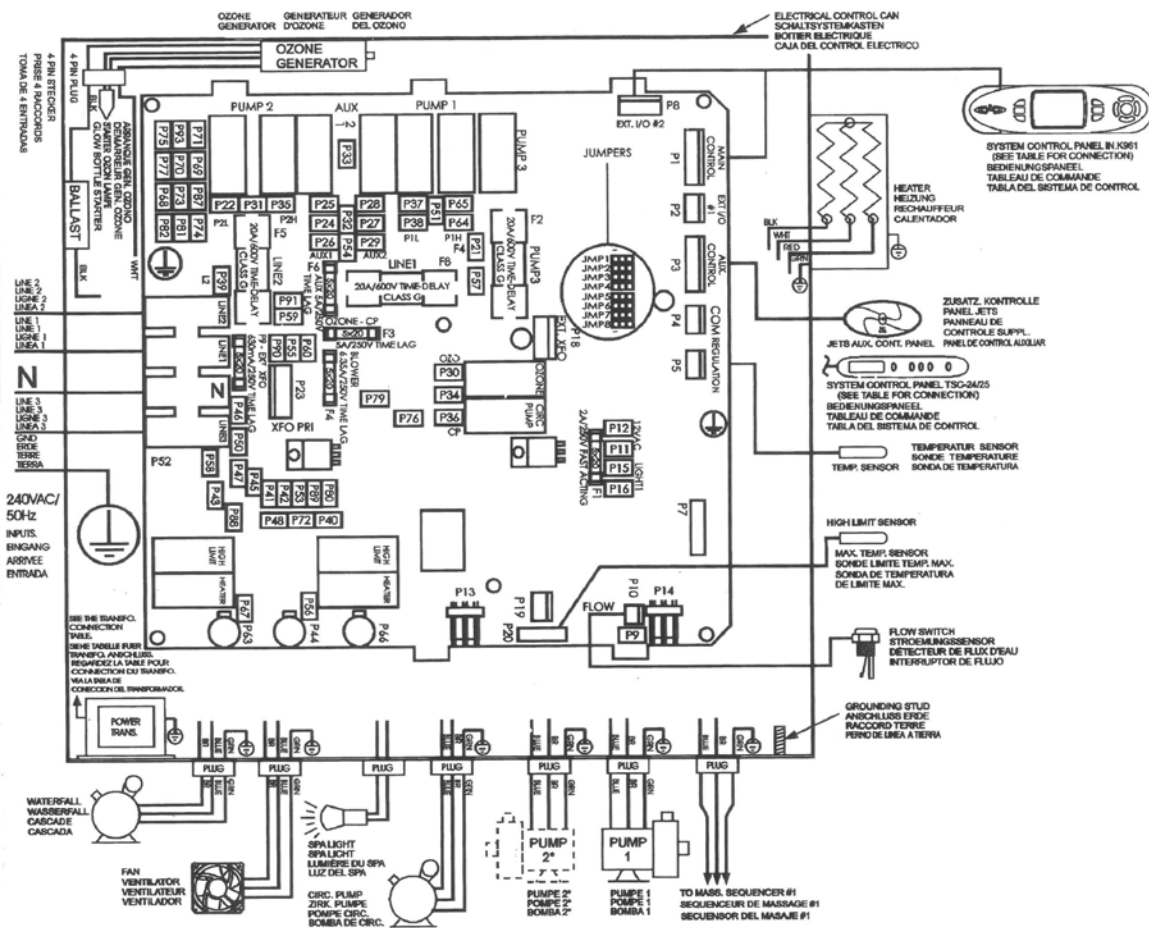
## Heater - 1x16A, 2x16A, 1x32A









Voltage	230V
Blue or white	P66
BR&BLK or RED&BLK	P63
Green / Ground	P77

## Other Components

Upper control, TSC-24 D13	P4&P8	High limit sensor	P20	Palm Pilot adapter	P7
Upper control, M-Drive	P1&P8	Temperature sensor	P5		
Aux. control, TSC-17	P3	Flow switch	P10		
DJS-2	P4	Light	P14		

# Wiring Diagram - MAS-MSPA-MP-D18-CE

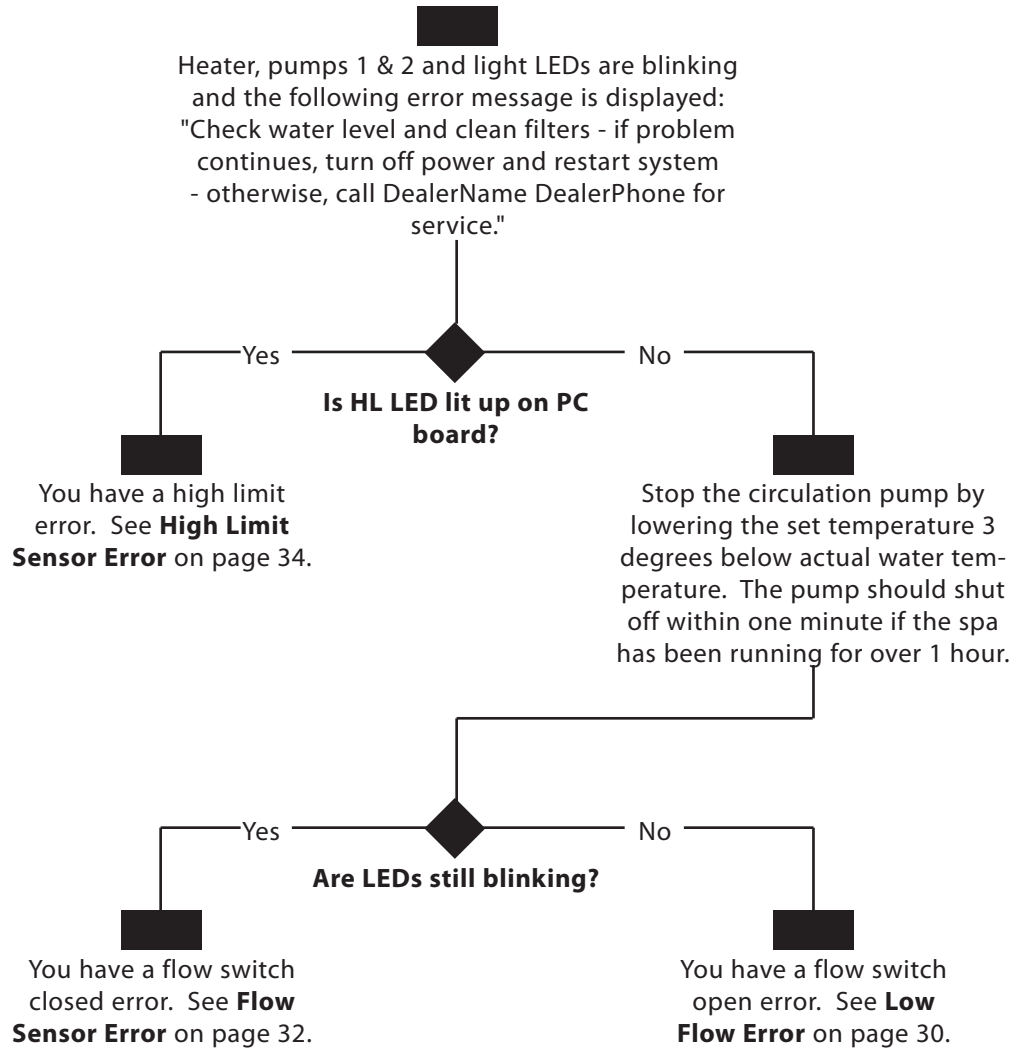


Fan		Waterfall		Ozone Generator		Mass. Sequencer		Transformer	
<u>Voltage</u>	<u>230V</u>	<u>Voltage</u>	<u>230V</u>	<u>Voltage</u>	<u>230V</u>	<u>Voltage</u>	<u>230V</u>	<u>Voltage</u>	<u>230V</u>
Blue / Neutral	P53	Blue / Neutral	P50	White / Neutral	P46	Blue / Com	P47	5-pin, org/wht	P23
Brown / Line	P24	Brown / Line	P27	Brown / Line	P30	Brown / Line	P34	4-pin, yel/blu/red	P18
Green / Ground		Green / Ground		Green / Ground		Green / Ground			
<b>Pump</b>		<b>Pump 1</b>	<b>Pump 2</b>	<b>Circulation Pump</b>		<b>Heater - 1x16A, 2x16A, 1x32A</b>			
<u>Voltage</u>	<u>230V</u>	<u>230V</u>		<u>Voltage</u>	<u>230V</u>	<u>Voltage</u>		<u>230V</u>	
Blue / Com	P48	P45		Blue / Com	P41	Blue or white		P66	
Brown / High Speed	P64	P35		Brown / Line	P36	BR&BLK or RED&BLK		P63	
Green / Ground				Green / Ground		Green			
<b>Other Components</b>									
Upper control, TSC-24 D13		P4&P8		High limit sensor		P20	Palm Pilot adapter		P7
Upper control, M-Drive		P1&P8		Temperature sensor		P5			
Aux. control, TSC-17		P3		Flow switch		P10			
DJS-2		P4		Light		P14			

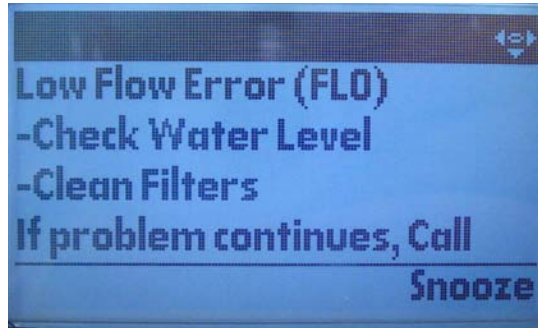


# LEDs Flashing on Upper Control

This flow chart shows how to determine what error the system has.



# Low Flow Error (FLO)



The LOW FLOW ERROR (FLO) is related to the flow switch. The system does not detect any water flow when the circulation pump is automatically turned on.

**Note that there must be enough water in the spa for normal use. Water level should be 3-5cm above the bottom of the tile line. The error can also occur when the Ultra Pure filter is dirty or when something limits the flow of water in the system.**

Only the heater is shut off when a LOW FLOW ERROR occurs.

Flow switches utilize a reed switch with a connected paddle that actuates when water moves through the switch. When actuated, the paddle comes to rest against a plastic post located in the center of the flow switch fitting. This post prevents the paddle from getting bent or distorted.

**Power can remain on while the following steps are performed.**

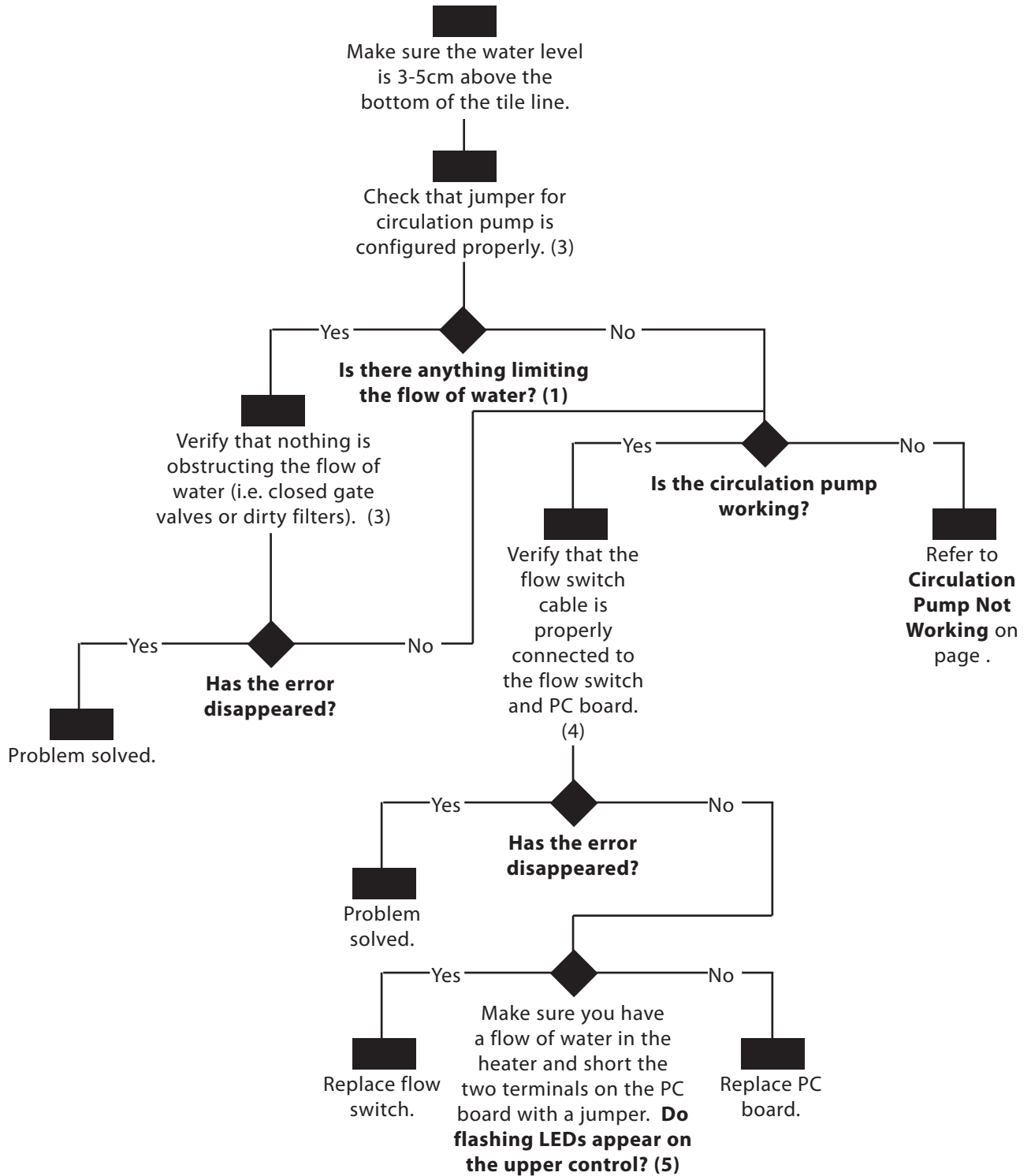
- 1) Make sure that the Ultra Pure filter is clean. Ensure that there are no air locks by looking for air bubbles coming from the ozone jet. Check for proper water level and anything else that could limit the flow of water.
- 2) Verify that the circulation pump is working. If the pump is not functioning properly, refer to the **Circulation Pump** section on page 58.
- 3) Check the position of the jumpers for the circulation pump (refer to jumper settings on wiring diagram inside pack lid). Wrong position can create a LOW FLOW ERROR.
- 4) Verify that the flow switch cable is properly connected to the PC board. Reference wiring diagram inside pack lid for exact position.
- 5) If the cable is properly connected, make sure there is water flow in the heater. By looking through the clear tee fitting of the flow switch, one can easily see the position of the reed switch paddle. If the paddle is against the plastic post, water flow is good. If the flow is good, there should be continuity through the switch.

Remove the flow switch cable from the Px connector on the PC board and check for continuity in the switch. Reference wiring diagram inside pack lid for exact position. Using an Ohmmeter, measure the resistance between the two wires of the cable. Use a small paper clip in each of the holes on the connector to get a more accurate reading.

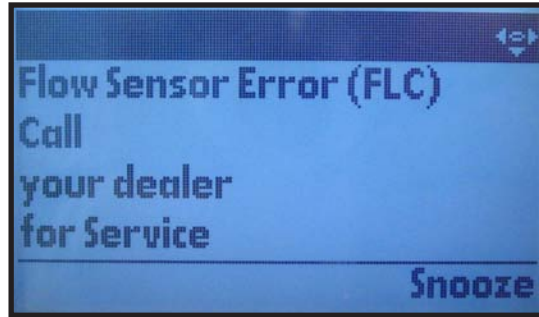
- 6) If you receive a flow error and there is continuity through the switch, i.e. reading very low or zero ohms, replace the PC board.
- 7) If there is no continuity through the switch, i.e. reading very high or infinite ohms, replace the flow switch.
- 8) If the circulation pump is on and the reed switch paddle is moved away from the post, there is not enough water flow to move the paddle. Check the filter, inner filter screen, water level and the circulation pump for blockage.

# Low Flow Error (FLO) Flow Chart

If a flow sensor error occurs, follow this troubleshooting flow chart to identify and correct the problem:



# Flow Sensor Error (FLC)



The FLOW SENSOR ERROR is related to the flow switch. If the system detects any flow when the circulation pump is off, the FLOW SENSOR ERROR occurs.

**If there is a FLOW SENSOR ERROR status when there is a call for heat, the heater will not be allowed to turn on. The error condition must be cleared before any heating can occur.**

**Power can remain on while the following steps are performed.**

- 1) Check position of jumpers for circulation pump. Reference wiring diagram inside pack lid for exact location. Wrong position can create a FLOW SENSOR ERROR.
- 2) Ensure that the circulation pump is not running by unplugging it. In this condition, the reed switch paddle should be away from the post and there should be no continuity through the switch. Look through the clear tee fitting to determine the position of the paddle.

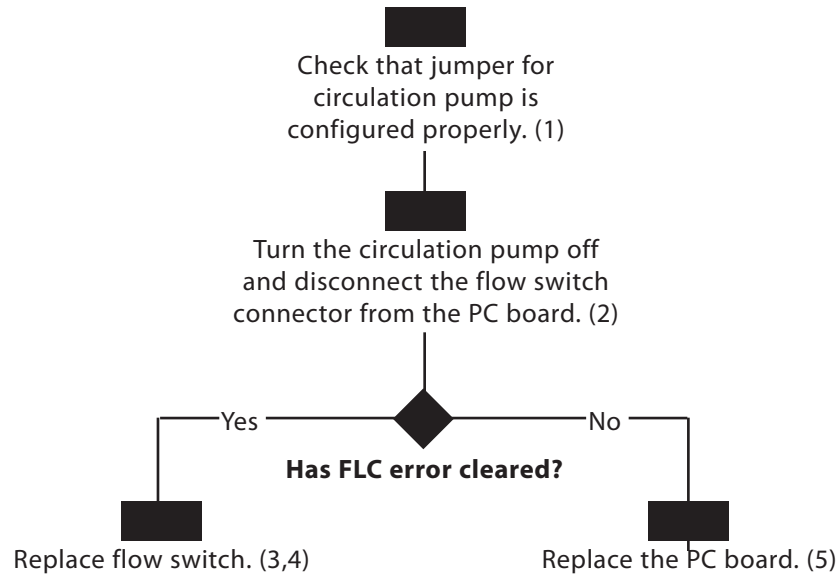
Remove the flow switch cable from the Px connector on the PC board and check for continuity in the switch. Reference wiring diagram inside pack lid for exact position. Using an Ohmmeter, measure the resistance between the two wires of the cable. Use a small paper clip in each of the holes on the connector to get a more accurate reading.

- 3) If there is continuity through the flow switch, i.e. reading very low or zero ohms, replace the flow switch.
- 4) If there is not continuity, i.e. reading very high or infinite ohms, replace the PC board.
- 5) If the flow switch paddle is against the post and the circulation pump is not running, replace the switch.

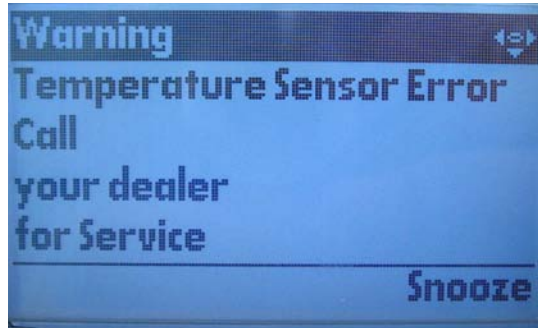
**NOTE: When the flow switch is changed in the field, the whole flow switch assembly is not changed. Only change the flow switch (P/N 01710-131).**

# Flow Sensor Error (FLC) Flow Chart

If a low flow error occurs, follow this troubleshooting flow chart to identify and correct the problem:



# Temperature Sensor (0° Error)



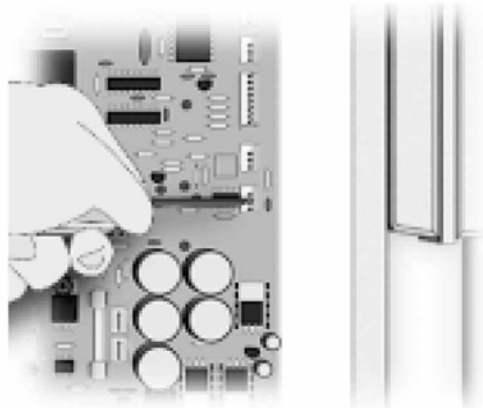
The 0° error indicates a temperature sensor problem. The system is constantly verifying that the temperature sensor reading is within normal limits.

The temperature sensor is located in the sensor holding tee inside the equipment compartment, behind the circulation pump.

Note that the water temperature should be over 2°C to perform the following steps.

When a temperature sensor error occurs, the default temperature, either 0°C or 55°C, will appear on the display. This is the error code.

**Press any key after each step to reset the system. Do not turn the power off because it will clear the error message for one hour after turning the spa back on.**



1) Verify that the temperature sensor is properly connected to Px. Reference wiring diagram inside pack lid for exact position.

2) Disconnect the probe connector and clean the pins by scraping them with a flat head screwdriver. A small coating of film may cause a bad connection.

3) Reconnect the probe.

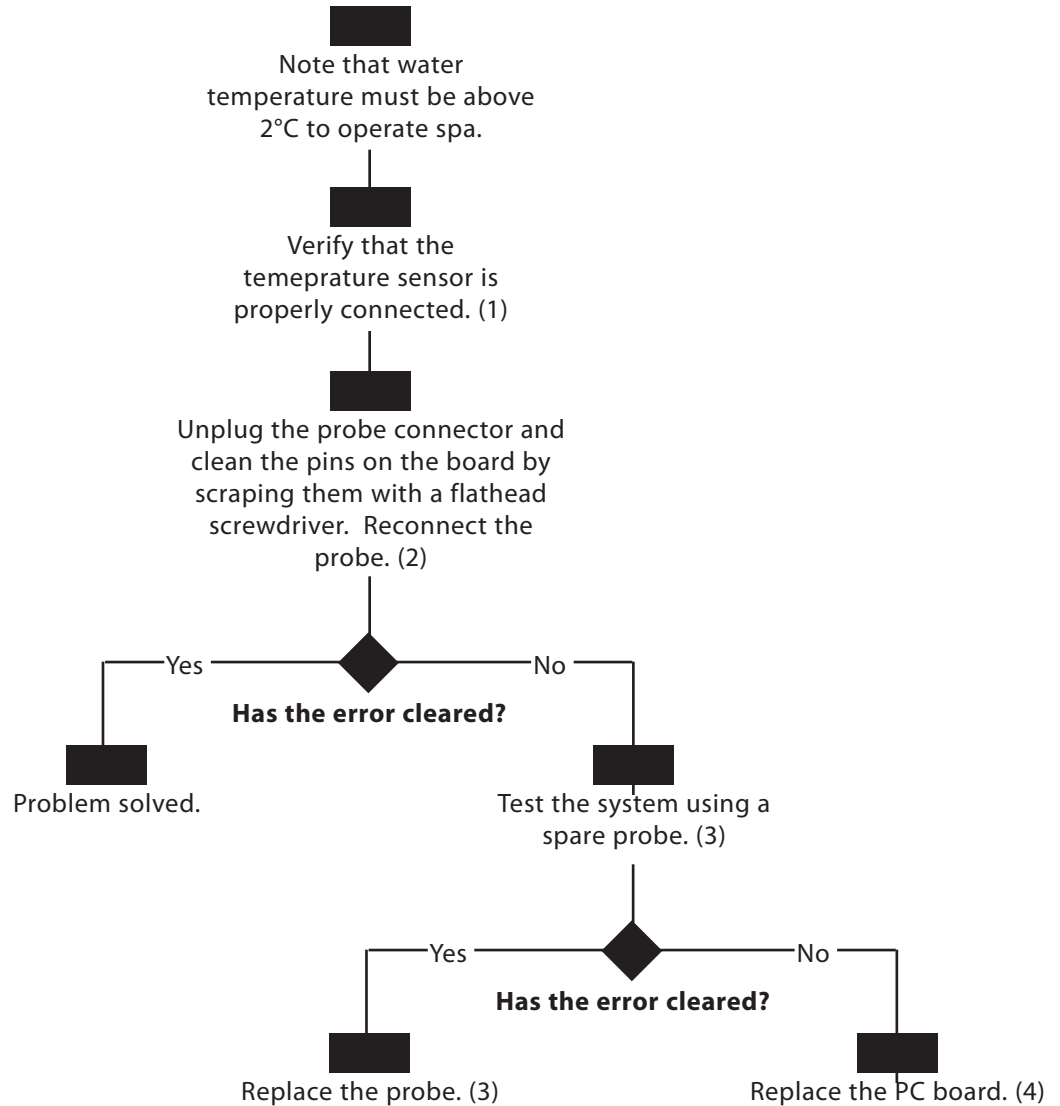
a) If 0° error is still present, replace the probe with a spare and place its stainless steel head directly in the spa water.

b) If the problem is solved, replace the probe.

4) Replace the PC Board if the problem has not been corrected.

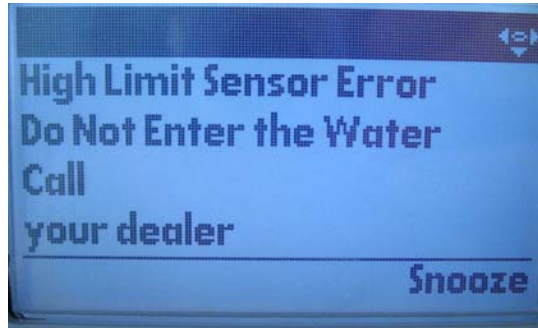
# Temperature Sensor Error (0° Error) Flow Chart

If a temperature sensor error occurs, follow this troubleshooting flow chart to identify and correct the problem:





# High Limit Error (HL)



The HIGH LIMIT SENSOR (HL) error occurs whenever the high limit sensor reads heater body temperature above 48°C.

**Push any button after each step to reset the system. Power can remain on.**

**NOTE: In hot climates, overheating may occur if the pump is set to operate for extended periods of time with the cover in place. If this happens, remove the spa cover and allow the water to cool below 42°C. Push any pad on the upper control panel to reset the system.**

**NOTE: The HIGH LIMIT SENSOR error can also be caused by the sensor seeing a large increase in temperature in a short period of time, which may indicate a flow problem. Reset the error message, check again and see LOW FLOW ERROR section on page 28.**

1) Measure the water temperature with a digital thermometer. Is water temperature on the display correct?

If temperature reading is within  $\pm 1^\circ\text{C}$ , follow next step.  
If reading is not correct, refer to step 8.

2) Verify that the sensor is properly secure on the heater.

3) Check if the heater barrel feels hot.

When the red LED on the PC board is lit, try to reset the breaker. If the LED turns off, wait until it comes back on before touching the heater barrel.

If it is hot, verify that nothing is obstructing the flow of water (closed gate valves or dirty filter).

4a) Verify that the fan works by pressing any pump button.

4b) If the fan does not work, check the fuse. Replace if necessary.

4c) Check the voltage at the fan. If you get 230V, replace the fan.

5) Verify that the high limit probe is properly connected. Clean the probe connector pins on the PC board. A small coating of film may cause a bad connection. Reconnect the probe.

6) If HIGH LIMIT SENSOR (HL) error still occurs, replace the probe.

7) If the problem is not solved, replace the PC board.

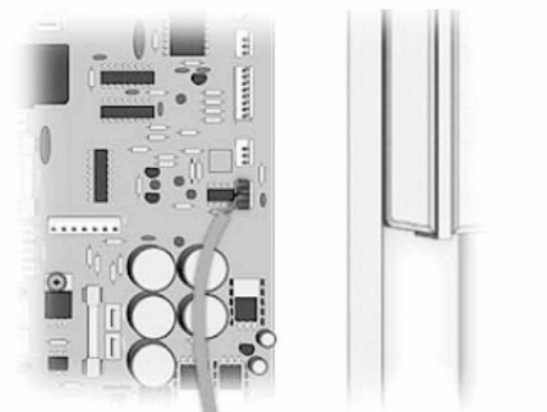
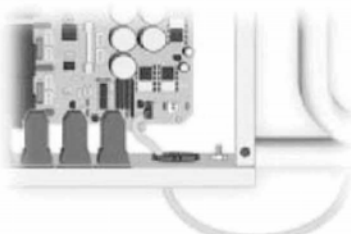
8) If a digital thermometer reading of the water temperature is at or higher than 48°C and the topside control's display does not show the right temperature, verify that the temperature probe is in contact with water and that cold air coming from the back can not affect its readings.

Use foam to isolate the probe from cold air if it is the source of the problem.

9) Verify if the temperature probe is properly connected. Clean the connector pins on the PC board.

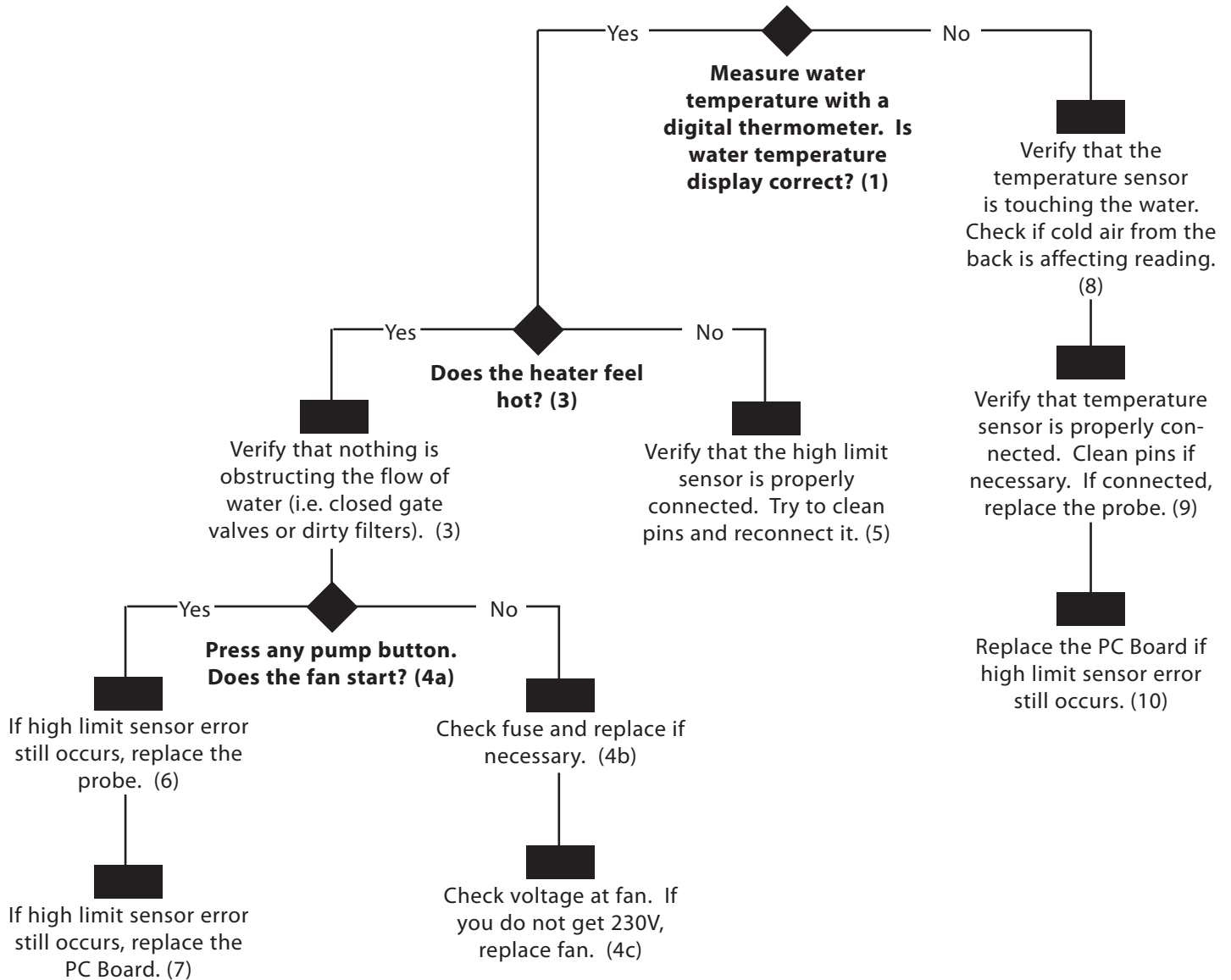
If the temperatures are still not the same, replace the probe.

10) Replace the PC board if red LED on PC board stays lit.

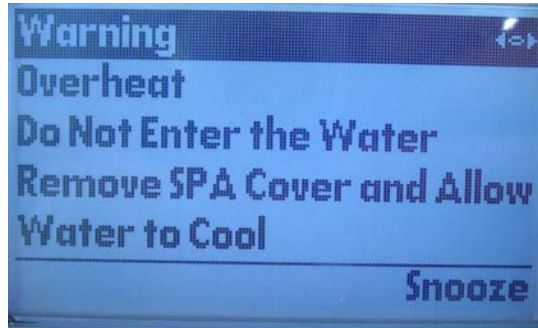


# High Limit (HL) Error Flow Chart

If HIGH LIMIT SENSOR (HL) error occurs, follow this troubleshooting flow chart to identify the source of the problem:



# Overheat Error



The OVERHEAT error message will appear on the display whenever water temperature read by the temperature sensor reaches 44°C.

When the OVERHEAT message is displayed, all functions are automatically turned off until the water temperature cools down to 43°C.

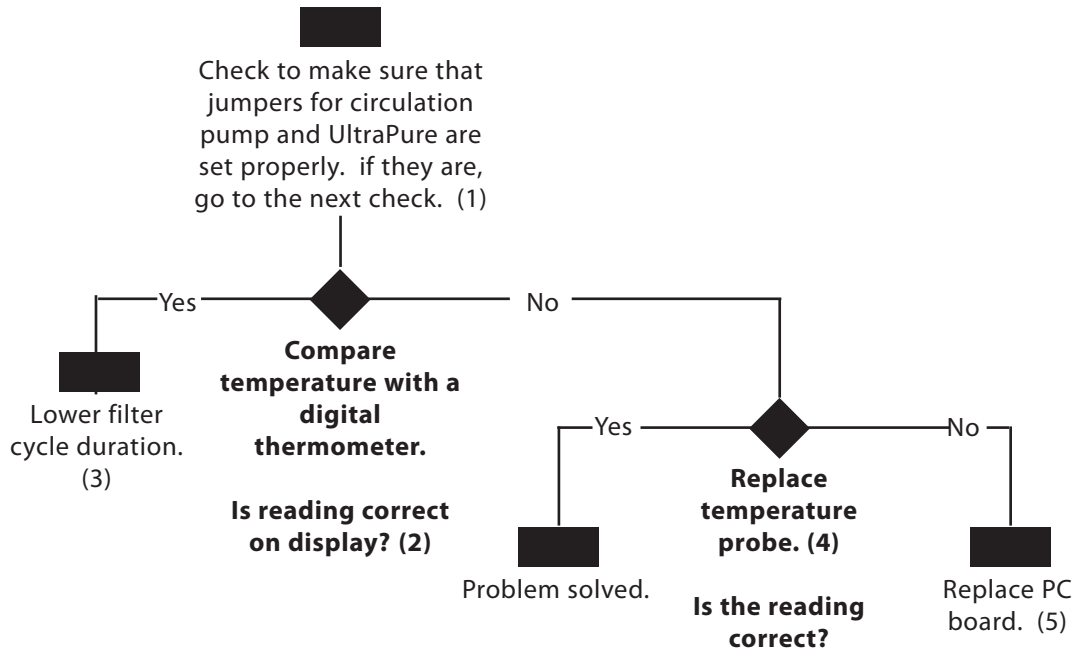
This condition can occur in hot climates due to the spa's insulation. Propping one side of the cover up to allow the water to cool can help alleviate this problem.

- 1) Verify that the jumpers for the circulation pump and UltraPure are set correctly. Reference wiring diagram inside pack lid for exact position. If the settings are correct, go to the next check.
- 2) Partially drain the spa and fill it with cold water. Compare temperature on the display with a digital thermometer.
- 3) If the reading is correct, lower the filter cycle duration. Lengthy filtration cycles in warm weather can cause an OVERHEAT error.
- 4) If the reading is incorrect, disconnect the temperature sensor and replace with a spare. If this resolves the problem, replace the temperature sensor.
- 5) If the reading is still incorrect, replace the PC board.

# Overheat Error Flow Chart

Since OVERHEAT messages may be caused by lengthy filtration cycles in warm weather, reduce cycle duration and/or number of cycles.

This condition can also occur in hot climates due to the spa's insulation. Propping one side of the cover up to allow the water to cool helps to alleviate this problem. If the above two conditions do not apply, follow the flow chart below to alleviate the problem.

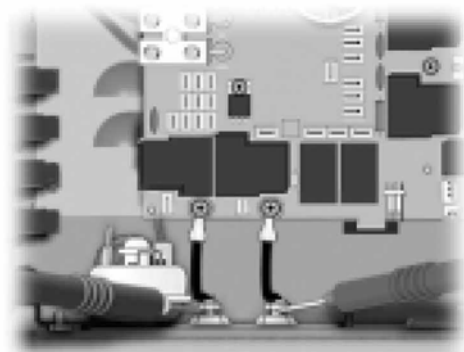


# Ice Condition

The ICE CONDITION message indicates that the system has detected water cold enough to freeze the pipes and has gone into protective Smart Winter Mode. The spa will stay in Smart Winter Mode for 24 hours.

Follow these steps to correct the problem:

- 1) With a digital thermometer, verify the temperature of the water.



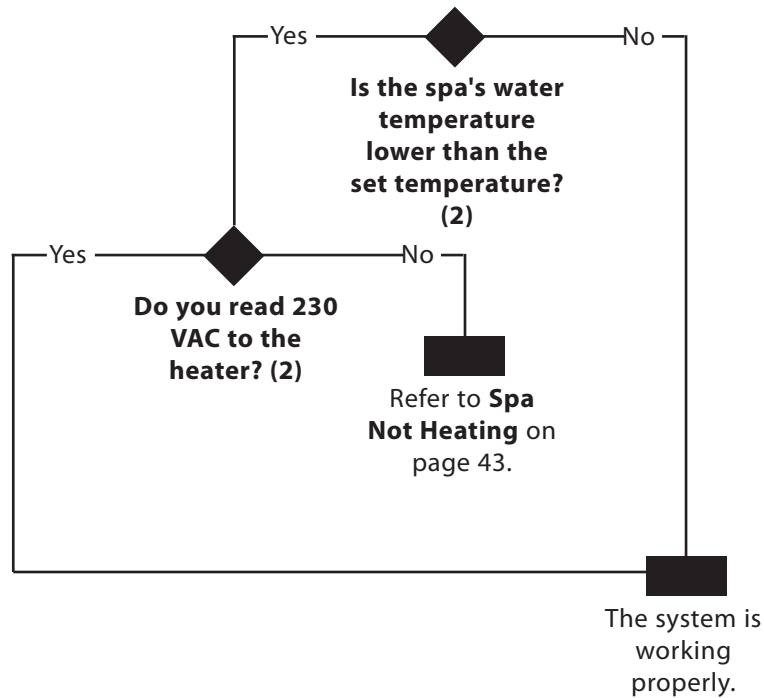
- 2) If the water temperature is lower than the desired temperature, measure the voltage to the heater.

If your reading is approx. 230 VAC, Smart Winter Mode is working properly.

If you do not get 230 VAC, refer to the **Spa Not Heating** section on page 43.

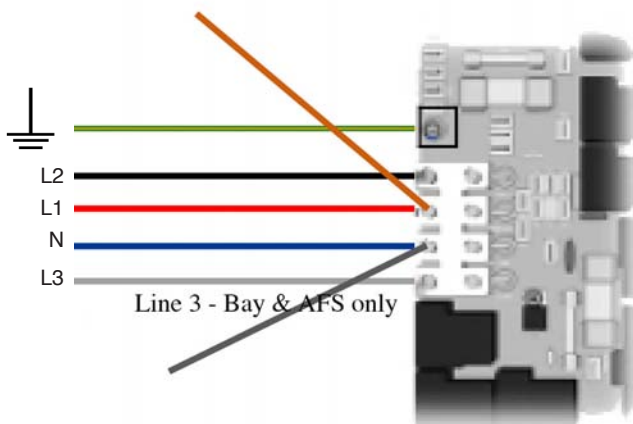
# Ice Condition Flow Chart

An ICE CONDITION occurs when the PC Board detects that the pack area temperature has dropped below 20°C. This indicates that the system has gone into the protective Smart Winter Mode. Follow this Troubleshooting Flow Chart to identify the problem:

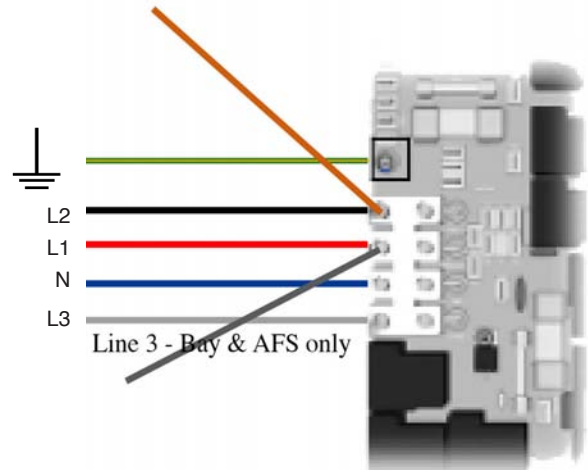


# Nothing Works

If everything is connected and nothing seems to work, perform the following tests to identify and correct the problem:



1a) On the terminal block, measure the voltage between line 1 (red) and neutral. You should get 230 VAC.

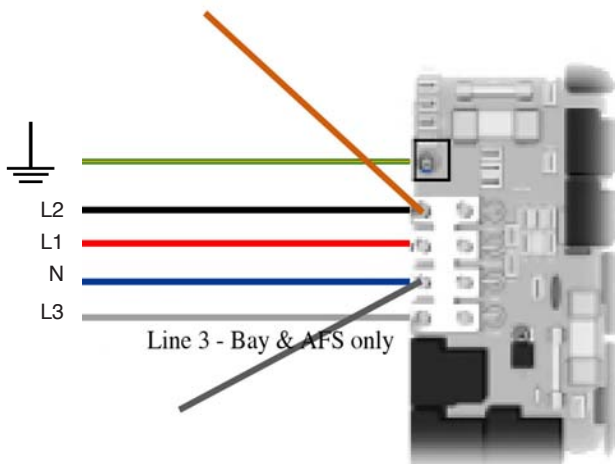


1c) Measure the voltage between line 1 (black) and line 2 (red). You should get 400 VAC if more than one phase is used.

1d) Measure the voltage between neutral (blue) and ground (green). You should get 0 VAC.

If you do not get the proper readings, there is a problem with the electrical wiring. **Call an electrician!**

If all voltage readings are good, go to step 2 on page 43.

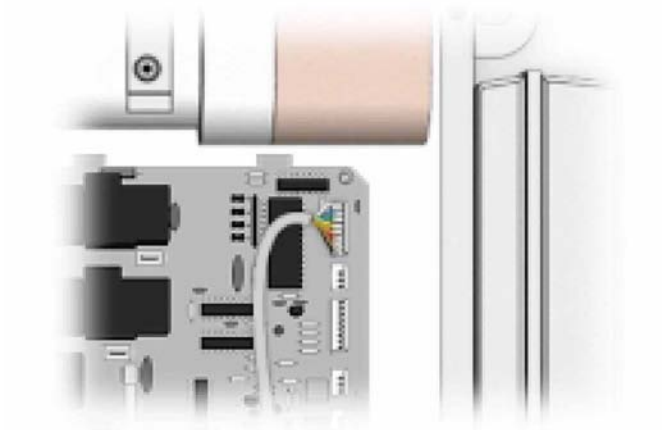


1b) Measure the voltage between line 2 (black) and neutral (blue). You should get 230 VAC.



# Nothing Works

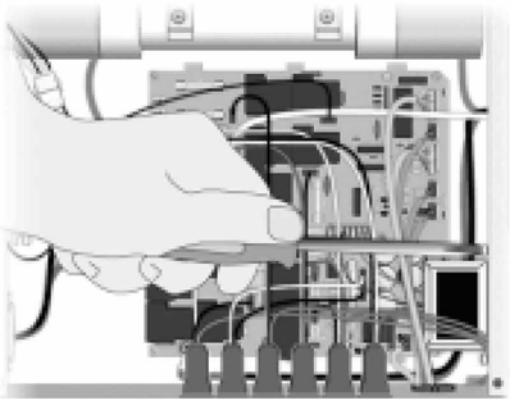
**NOTE:** These illustrations represent the MSPA-MP. Use the wiring diagram on the inside of the pack cover for exact locations.



2) Verify that the topside control is properly connected to the PC board.

3) Check the transformer fuse close to the white terminal block on the left. Replace if necessary.

4) If nothing works, clean the connector pins from the transformer. A small coating of film may cause a bad connection.

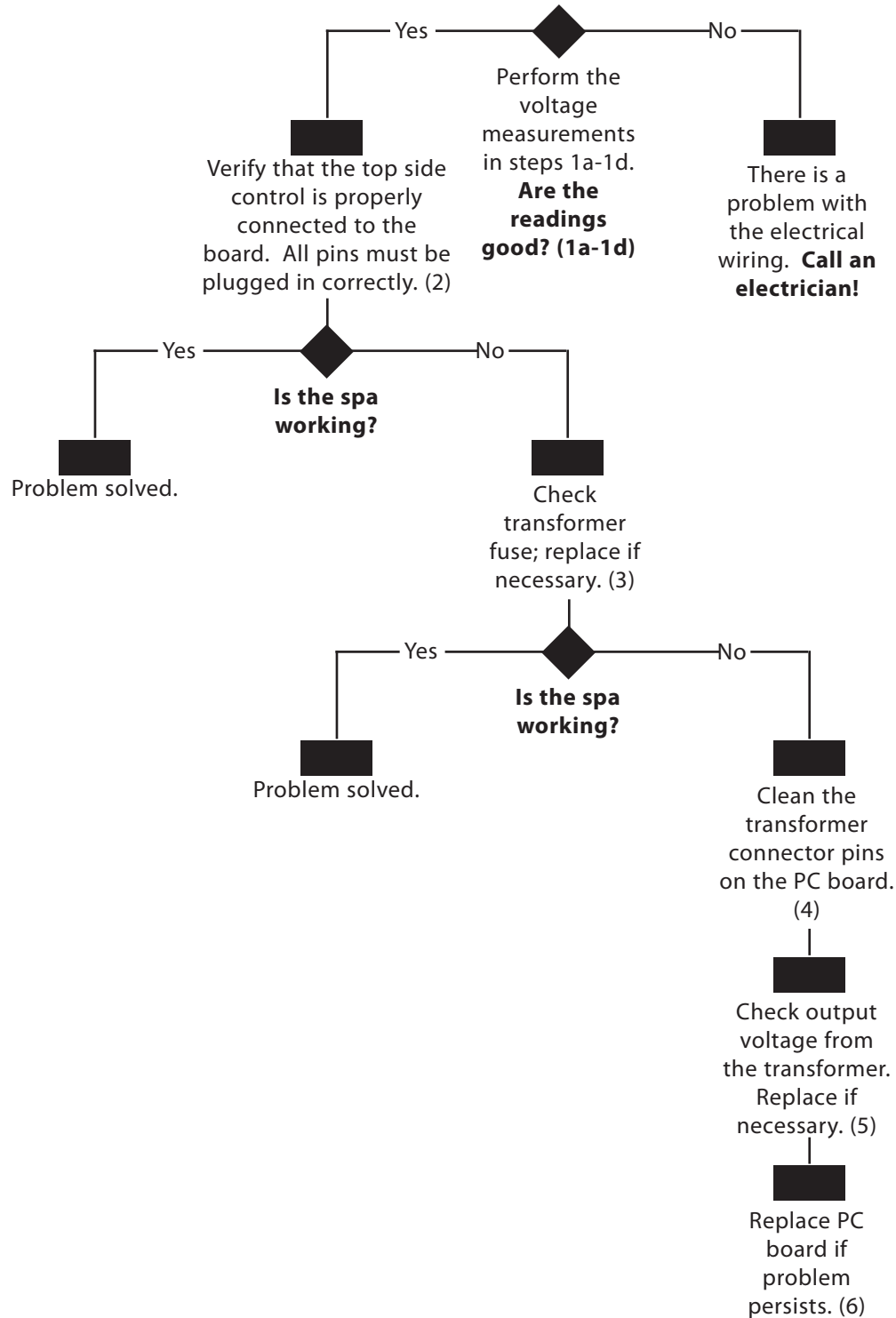


5) Check the output voltage from the transformer on the backside of the white connector while it is attached to the PC Board. You should get 12 VAC between yellow and blue and 24 VAC between yellow and red. If readings are not within 10% of the required voltage, replace the transformer. Yellow is common.

6) Replace the PC Board if steps 1-5 do not solve the problem.

# Nothing Works Flow Chart

If nothing is working, follow this troubleshooting flow chart to identify the source of the problem:



# Spa Not Heating

If the spa is not heating the water, perform the following tests to correct the problem:

1) If there is an error message displayed on the upper control panel, refer to the section in this manual for that specific error message.

2) With a digital thermometer, measure the water temperature and compare your reading to the temperature value displayed on the upper control panel.

If the values are not the same ( $\pm 2^{\circ}\text{C}$ ), ensure that the sensor is not touching the water and hot air from the back cannot affect the reading. Use foam to isolate the probe, if necessary.

If the sensor works, go to step 5. If not, go to step 3.



3) Replace the temperature sensor with a spare one.

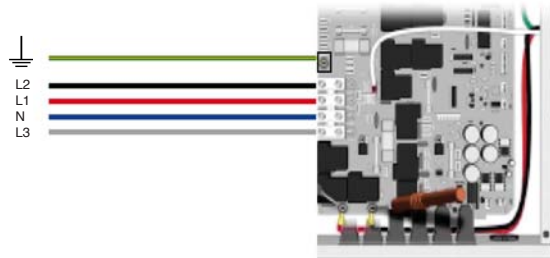
4) If the spa is still not heating, replace the PC board.

**NOTE:** This spa pack is equipped with two heating elements controlled by two relays.

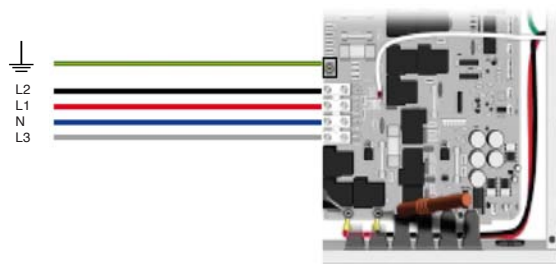
When one of the elements is working, the power will be 2.7kW. When the second element is working, it will generate 4.0kW. When both elements are working, they will produce 5.5kW.

The system decides which element to start depending on the water temperature and the current jumper settings.

5) To test the 4.0kW output, raise the set point more than  $2^{\circ}\text{C}$  above the actual water temperature. The heater icon should appear on the display.



6) Measure voltage between the black and red heater wire connectors P44 & P63 on **D15 - CE** PC Boards. It should be 220-240 VAC.



7) Lower the set point so it is just  $1^{\circ}$  above the actual water temperature. The heater icon on the display should remain on.

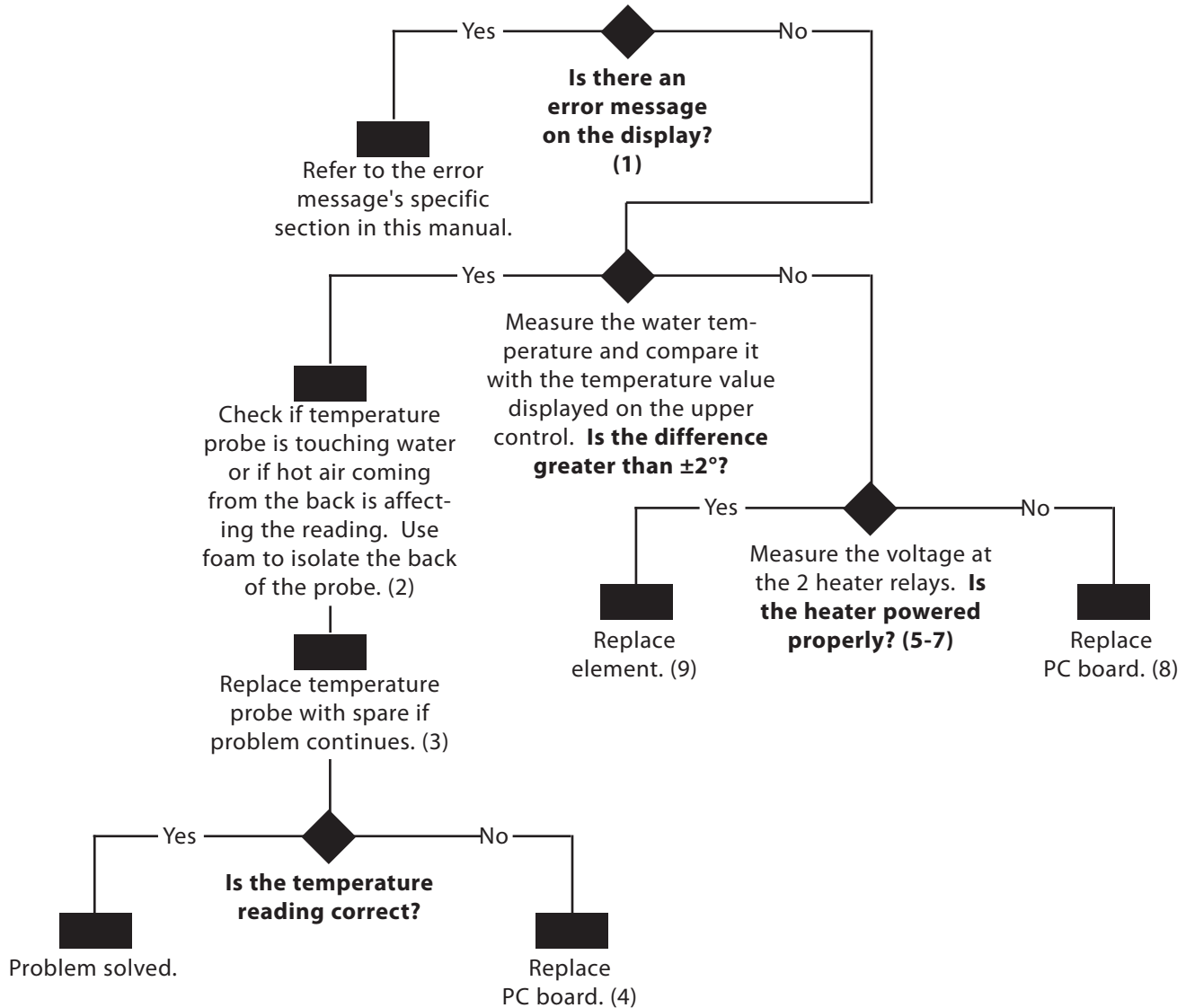
8) Measure the voltage between the white and the black heater wire connectors P66 & P63. It should be 220-240 VAC.

9) If one of the outputs does not work, replace the PC board.

10) If both outputs are OK, replace the heater.

# Spa Not Heating Flow Chart

If the spa is not heating the water, follow this troubleshooting flow chart to identify the source of the problem:



# Jet Pump Does Not Work

To increase the life of the relay, Scrolling Message Center spas use a “snubber” circuit on the pump relay. With this type of circuit, if a pump is not connected to an output and the relays are open, the voltmeter will still read voltage. This is normal.

It is important to measure voltage when the pump is connected to the pack. Power must remain on.

On Bay Series spas, pumps 2 and 3 are single-speed pumps. The pump 1 on the Bay series before 2008 are single speed. It is dual speed since 2008.

If a pump does not work, perform the following steps to correct the problem:

- 1) If an OVERHEAT message is displayed on the upper control panel, refer to the **Overheat Error** section on page 36.



- 2) Make sure other pumps are off. Check if the pump icon appears on the upper control panel when the pump button is pushed.

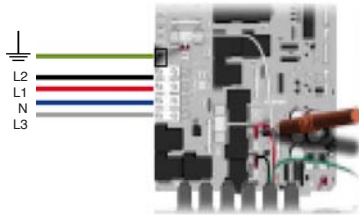


- 3) If the pump icon does not appear, use a spare upper control panel to check if the panel is defective. If the pump works with the spare panel, replace the upper control panel. If not, replace the PC board.

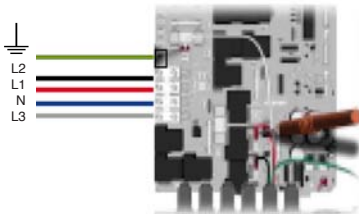
# Jet Pump Does Not Work

4) If the icon appears on the upper control panel and the pump does not work in either speed, check the pump fuse. Large fuses are for pumps. Replace if necessary.

5a) If replacing the fuse is not effective or if the pump works in one of two speeds, check the voltage on the board for both speeds.



5b) Turn pump on in high speed and measure the voltage between the brown and blue wire connectors. The reading should be 220-240 VAC.



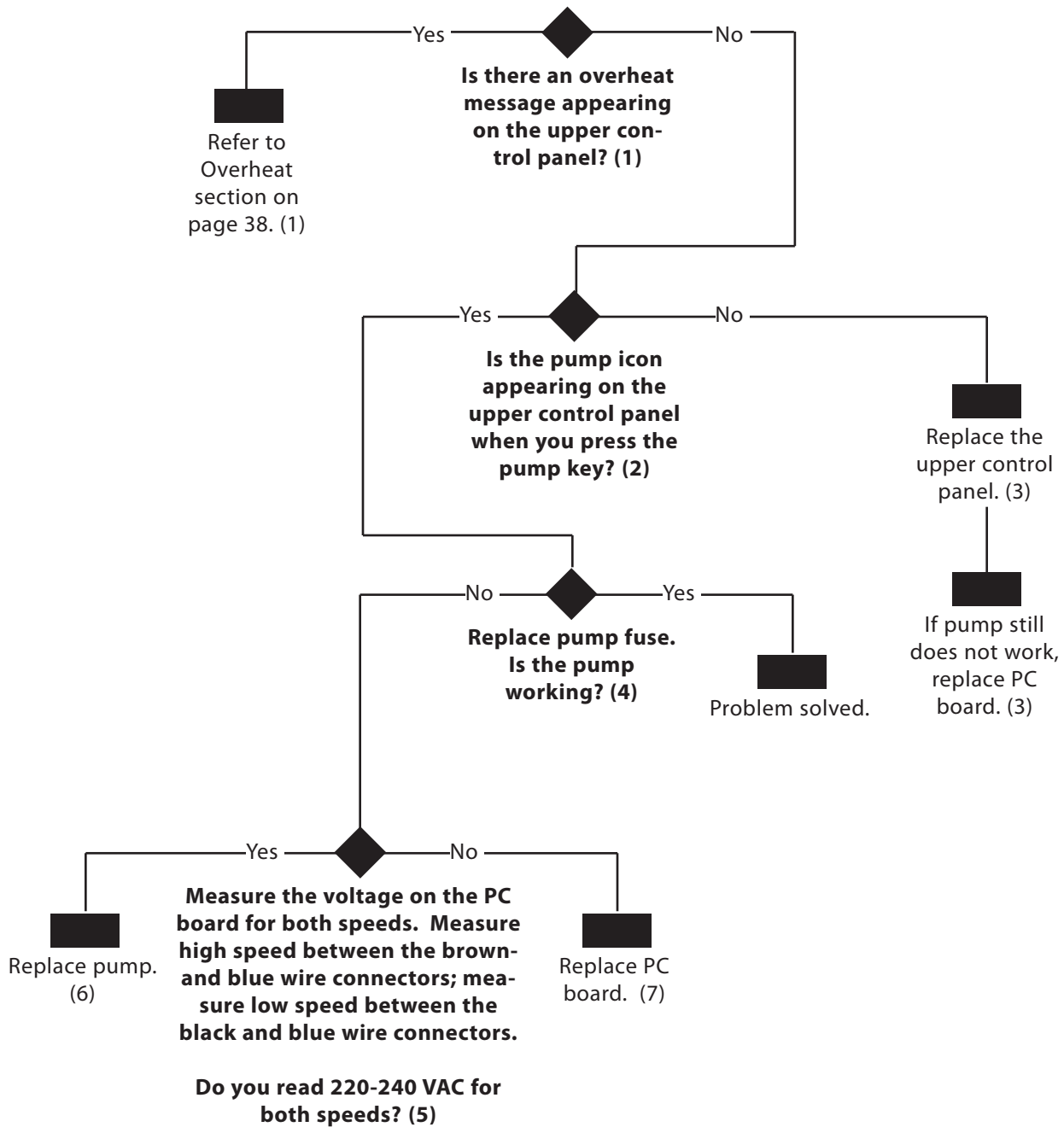
5c) Turn pump on in low speed and measure the voltage between the black and blue wire connectors. The reading should be 220-240 VAC.

6) If the voltage is correct, replace pump.

7) If the voltage is not correct, replace the PC board.

# Jet Pump Flow Chart

If any jet pump does not work, follow this troubleshooting flow chart to identify the source of the problem:





# Spa Light Does Not Work

If the spa light does not work, perform the following tests to correct the problem.

**It is important to measure voltage when the light is connected to the pack. Power must remain on.**

1) If the light is not working, verify that the light icon appears on the upper control panel when you push the light pad.

2) If the light icon does not appear, use a spare upper control to check if the control is defective. If it is, replace the control. If not, replace the PC board.

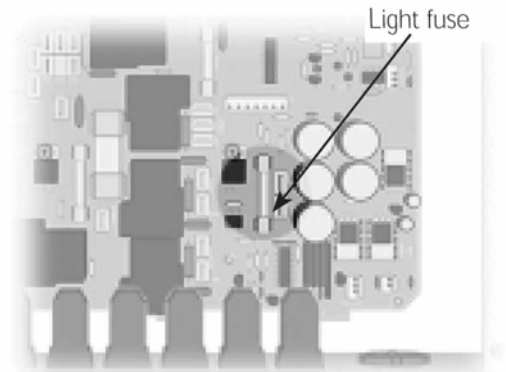
3) If the light icon appears but the light still does not work, make sure that the light is set to its highest setting and measure the voltage between the two wires of the light.

If you get 12 VAC, ensure that the wire connections are good and replace the light bulb.

4) If you do not read any voltage, replace the light fuse (F1) on the board.

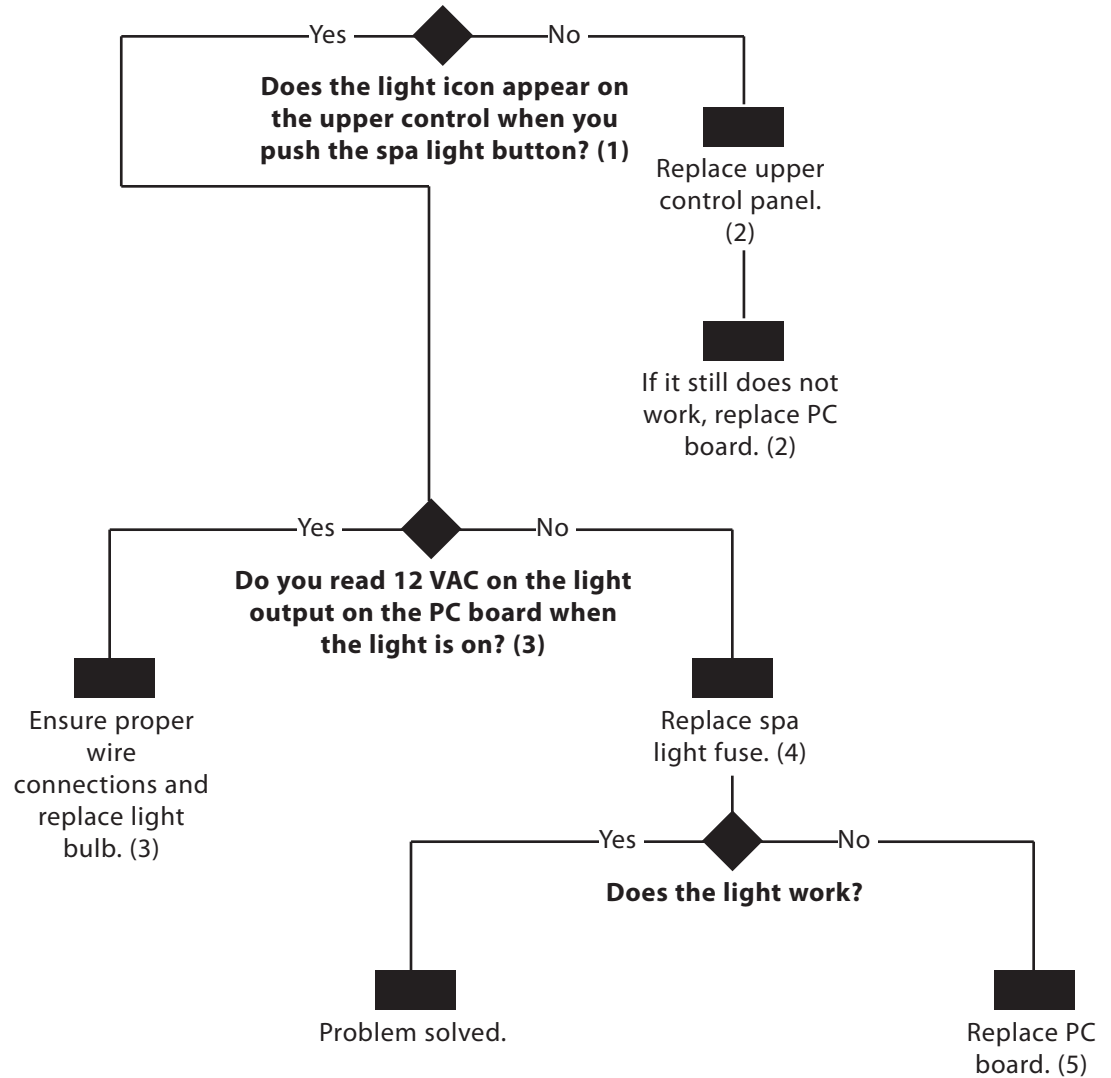
5) If the problem persists, replace the PC board.

**NOTE: Carefully hold the triacs on the PC board with pliers when replacing the board. One of these triacs controls the light. Bending the legs of the triac can cause the light to malfunction.**



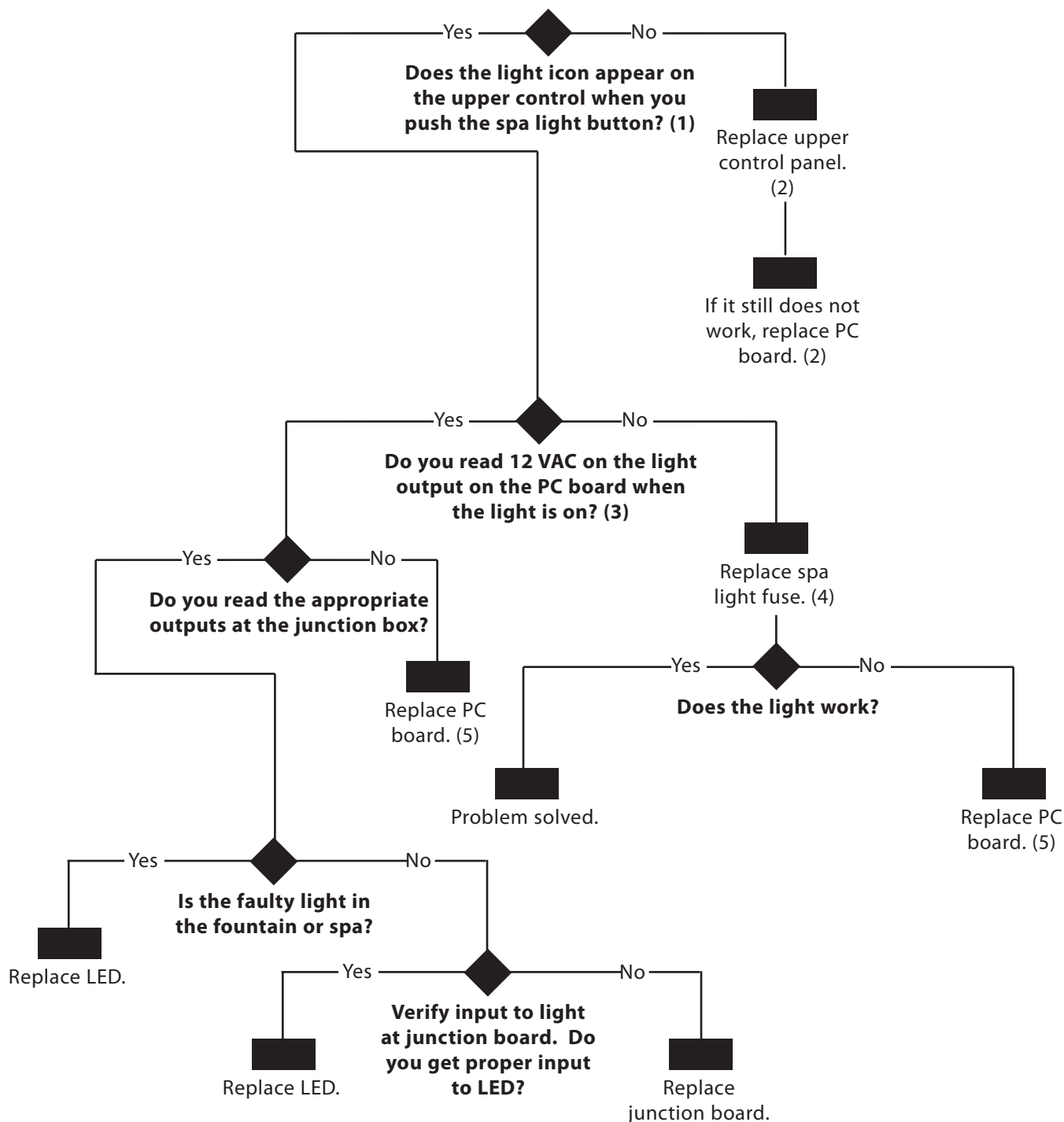
# Spa Light Flow Chart

If the spa light does not work, follow this troubleshooting flow chart to identify the source of the problem:

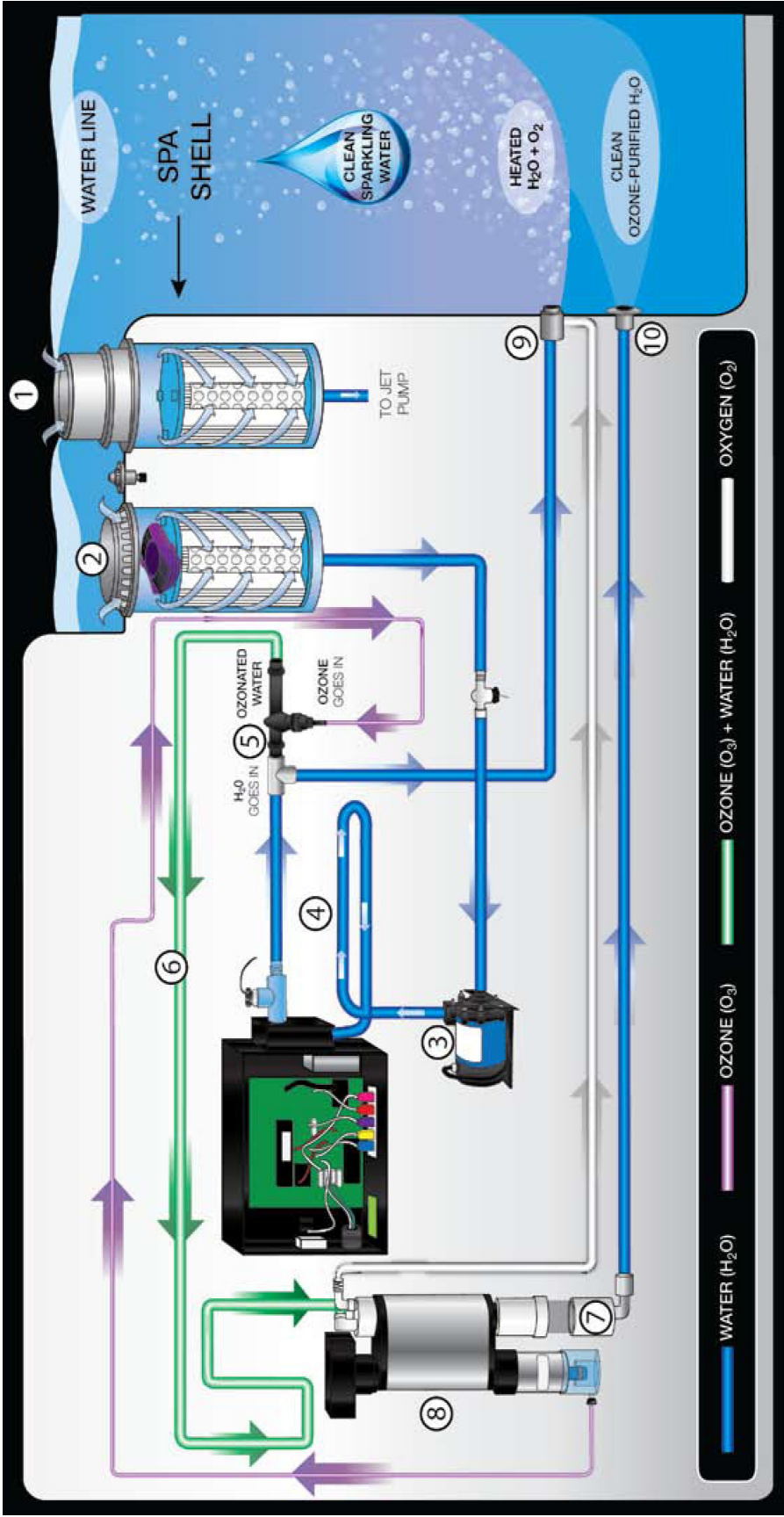


# LFX Flow Chart

If the Softouch Lighting does not work, follow this troubleshooting flow chart to identify the source of the problem:



# UltraPure Schematic



# UltraPure Water Management System

All spas in the Reflections line are equipped with the UltraPure Water Management System. Bay Collection spas are equipped with UltraPure PLUS, which adds a germicidal UV to the standard UltraPure system.

UltraPure is a complete water management system with two stages of ozone injection, two contact chambers, 100% filtration and heating on call. Using a silent circulation pump with a 7 GPM flow rate, UltraPure filters and ozonates 100% of the spa water.

## HOW ULTRAPURE WORKS

D1's UltraPure and PLUS systems circulate water through the first of two interchangeable, identical 75 ft<sup>2</sup> filters. Both filters are located in 8" canisters in the spa's skimmer recess area. The filter marked #1 in the diagram on page 51 is a jet pump filter; it's called that because the spa water is pumped through this filter at a high rate of speed via a jet pump (about 170 GPM). It captures large, visible particles and debris.

Water now travels through the dedicated second filter, marked #2 on page 51, which operates 24 hours a day and filters your water at a much slower rate (some 7-9 GPM). This filter removes much smaller, finer particles due to the slower rate of filtration, and operates off of a very quiet circulation pump (#3). Within the dedicated slow-rate filter is a special, rugged metal-mesh filter that also captures larger particles and substances. This ensures that debris won't get past filter #2 into the plumbing system. As such, D1 provides 3 primary filters in all. Filter #2 also houses the Vision sanitizing mineral cartridge.

Finely filtered water continues to be pumped through the system by the virtually noiseless circulation pump. The water now travels through your spa's ultra-efficient heater (#4).

Using the UV lightbulb, ozone gas is created in an enclosed, protected area of the ozone generator and then is pulled in the water by the Venturi effect created by the Mazzei T (#5), a small gas injector device.

The water/gas solution now travels through the first contact chamber (#6). This chamber gives the ozone ample time to begin the sanitization process of breaking down and zapping unwanted contaminants in the water.

The ozone/water mixture in the first chamber is now fired down into a second contact chamber (#7) through a stand pipe to more vigorously mix the ozone and water solution, thus further maximizing ozone/water molecule contact, providing a substantially improved and more powerful water sanitization system.

In the UltraPure PLUS system, the ozonated water/gas mixture now gets exposed to the additional UV germicidal (#8) created at a UV wavelength that's different than the one that created the ozone.

After the ozone bubbles travel down the stand pipe inside the second contact chamber, the off-gas bubbles rise and merge in a special reservoir toward the top of the stand pipe (#7 on the diagram). The length of the return hose is engineered to eliminate the off-gassing sometimes produced by conventional ozone systems. As the gas builds in the reservoir, it's combined with water and re-injected through an ozone jet into the spa.

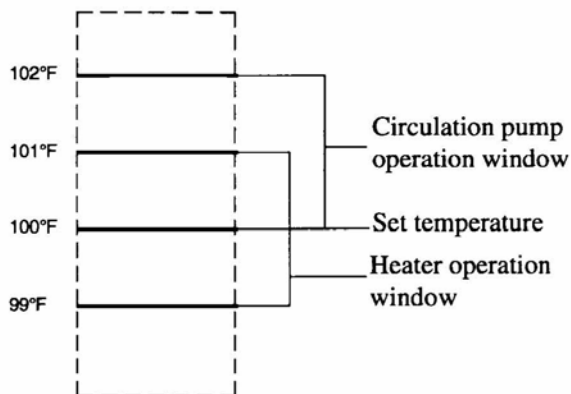
The water from the second contact chamber is also returned to the spa via a second return jet.

## RUNAWAY HEAT

Because Dimension One spas are so well insulated, the heat that the circulation pump adds can increase the water temperature in the spa. This problem is commonly referred to as runaway heating and can be experienced when a water circulation pump is used to drive the filtration, ozonation and/or heater of a spa.

To combat this, Dimension One has set up the system so that when the water temperature reaches 2° above the set point, the circulation pump turns off. After the water temperature has cooled back down to the set point, the pump is turned back on. The heater will not turn on until the water temperature reaches 1° below the set point.

There are exceptions to this behavior. When a jet pump is active, the circulation pump will remain on for 30 minutes after the jet pump is turned off. The circulation pump will also run for 30 seconds every 10 minutes, regardless of water temperature. This is to ensure proper water temperature readings and eliminate false overheat error messages.



# UltraPure Water Management System

If you experience a problem with the UltraPure Water Management System, follow these steps to resolve the issue:

**The UltraPure system does not operate properly because there are no air bubbles coming from the ozone jet above the spa's footwell, but the heater is operating normally.**

1) Remove the 75 ft<sup>2</sup> UltraPure filter. If the system starts producing bubbles, clean or replace the filter.

**NOTE:** Check to make sure the ozone jet is not blocked before continuing to the next step.

2a) Inspect the 1/4" check valve located just below the Mazzei T on the right side of the equipment compartment. Pull the hoses off the check valve and wait one minute.

2b) If the system starts producing bubbles with the check valve removed, ensure that the hose from the ozone generator to the check valve is not clogged. If the tubing is not blocked, the check valve is clogged and needs to be replaced.

2c) Reinstall the check valve with the letters "VAC" on the coned end of the valve pointing toward the Mazzei T.

3) Clamp the 1" hoses on both sides of the Mazzei T with a 6" needle nose vise grips. Loosen the hose clamps on the Mazzei T, pull off the 1/4" hose and replace the Mazzei T with a new one. Make sure that the flow arrow in the T is pointing to the right. Reinstall the hose clamps, push the 1/4" hose onto the 1/4" barb of the T, and remove the vise grips. If the problem is not corrected after one minute, continue to the next step.

4) If all the above checks do not solve the problem and the heater and circulation pump are operating properly, there is something caught in the plumbing. A dig out may be required to locate the blockage.

**There are large bubbles coming from the UltraPure return port (1/2" through wall fitting) and very few or no bubbles are coming from the ozone jet.**

**NOTE:** To prevent this problem, do not operate the spa without the 75 ft<sup>2</sup> UltraPure filter secured in its canister.

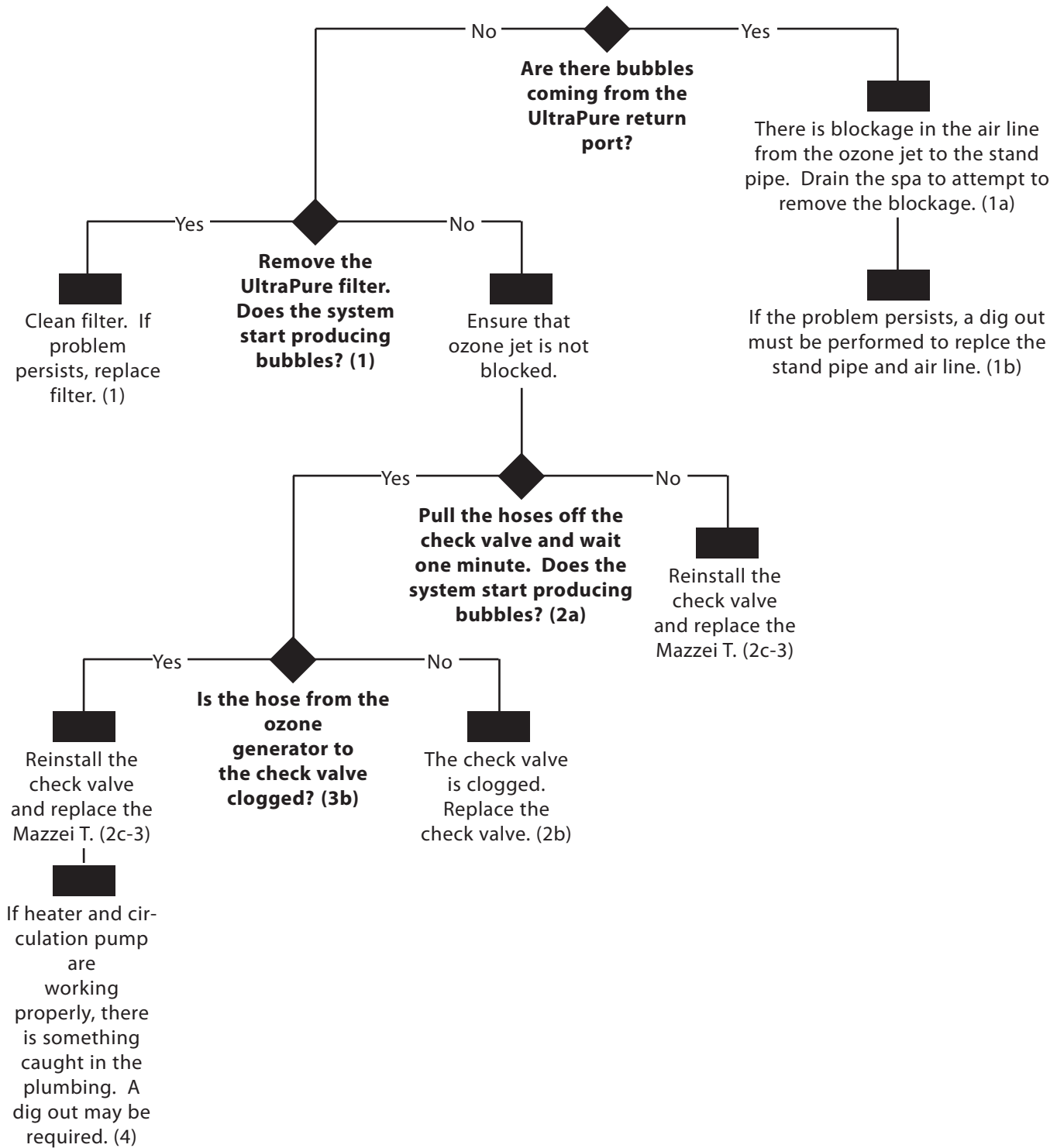
1) There is something caught in the air line from the ozone jet to the top of the UltraPure stand pipe.

1a) Attempt to remove the blockage by draining the spa.

1b) If draining does not solve the problem, the stand pipe and air line from the top of the stand pipe to the ozone jet will need to be dug out and replaced.

# UltraPure Flow Chart

If the UltraPure system does not work, follow this troubleshooting flow chart to identify the problem:





# Ozonator Does Not Work

To increase the life of the relay, Scrolling Message Center spas use a circuit called a “snubber” in the ozonator relay. With this type of circuit, if an ozonator is not connected to an output and the relays are open, the voltmeter will still read voltage. This is normal.

It is important to measure voltage when the ozonator is connected to the PC board.

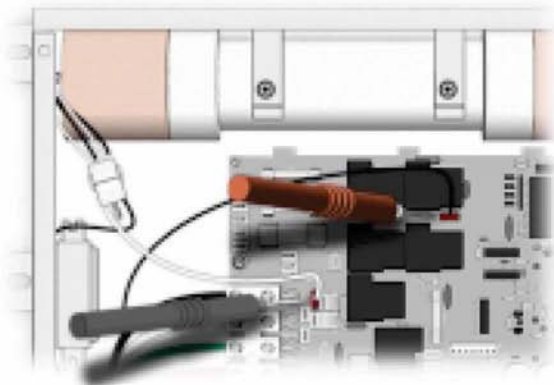
If the ozonator does not work, perform the following steps to correct the problem:



1) Make sure the circulation pump is on. The ozonator should be on when the circulation pump is on.

Open the spa pack and look at the ends of the ozone generator.

You should see a blue/green light if the light is working.

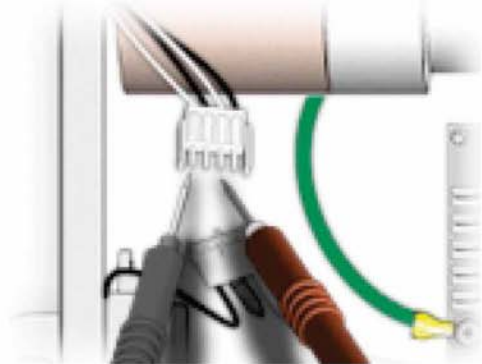


2) If the ozonator does not work, measure the voltage between the ozonator white and black wire connectors. You should get 220-240 VAC.

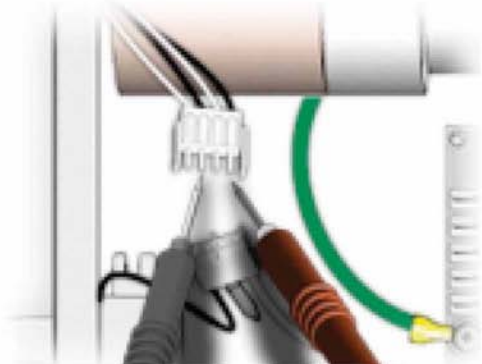
If voltage is good, go to step 3.

If voltage is not good, go to step 5.

3) If there is voltage, turn off the main power to the spa and disconnect the 4-pin connector for the UV light.



With an Ohmmeter, measure the resistance between the 2 white cable connectors.

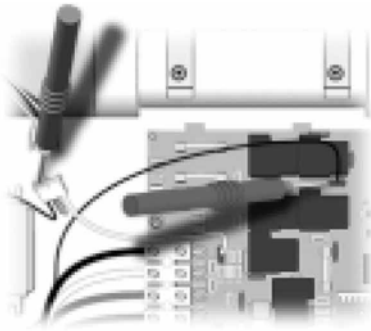


Do the same between the 2 black cable connectors.

If both resistances are low (0 to 4 Ohms), the UV light is good.

If either resistance is 5 Ohms or higher, replace the UV light.

# Ozonator Does Not Work

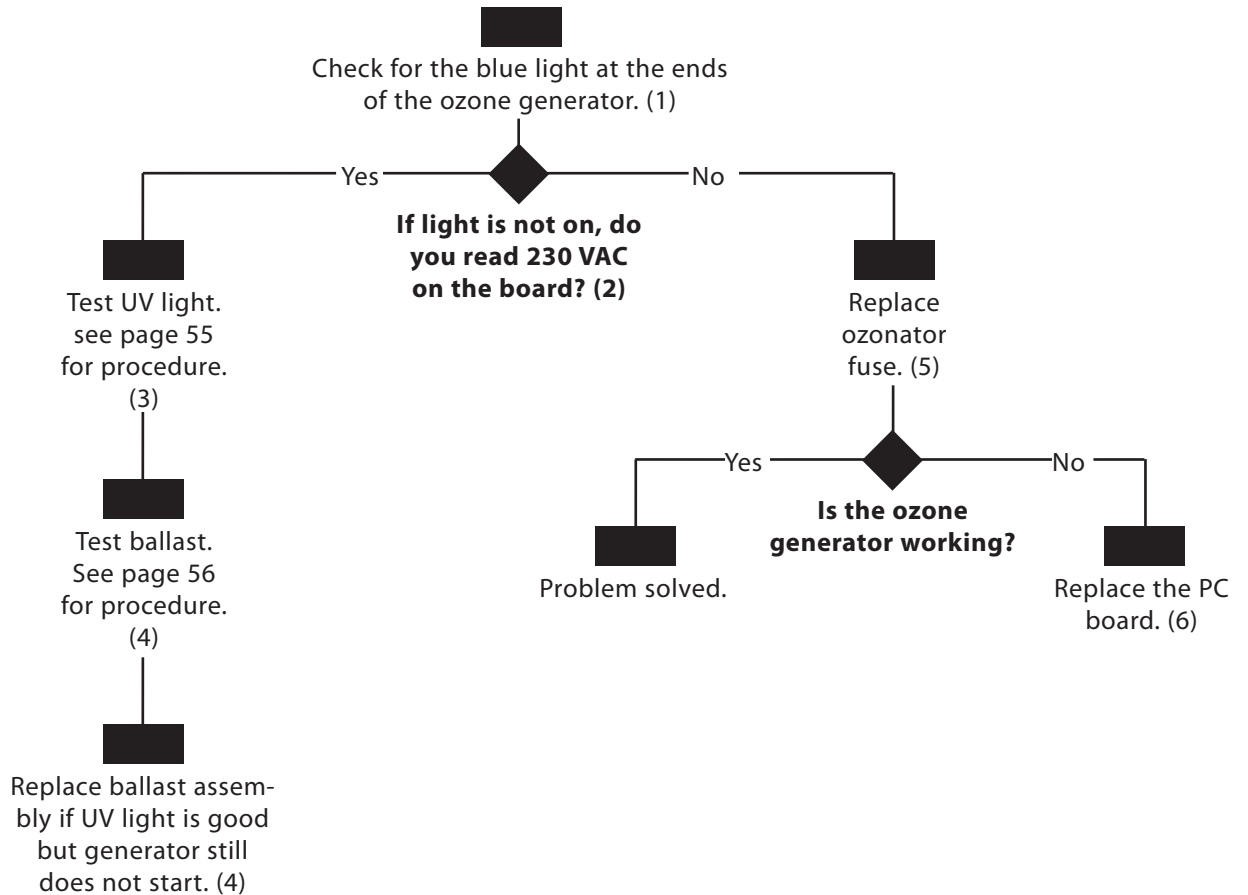


- 4) Take an Ohm reading on the ballast between the two black wires of the ballast. Check the wiring diagram on the inside of the pack cover for the exact location. The reading should be approximately 20 to 29 Ohms. If any other reading appears, replace the ballast.
- 5) Replace the ozonator fuse (F3) if you do not get proper voltage.
- 6) Replace PC board if you still do not get proper voltage.

# Ozonator Flow Chart

If the ozonator does not work, follow this troubleshooting flow chart to identify the problem:

**The ozonator should be on! Make sure the circulation pump is on.**



# Circulation Pump Does Not Work

If your spa's circulation pump does not work, follow these steps to correct the problem:

**- To increase the life of the relay, Scrolling Message Center spas use a circuit called a "snubber" on the circulation pump relay. With this type of circuit, if the circulation pump is not connected to an output and the relays are open, the voltmeter will still read voltage. This is normal.**

**- It is important to measure voltage when the circulation pump is connected to the pack. Power must remain on.**

1) Start the circulation pump by increasing the temperature set point to 1-2° higher than the actual water temperature.

2) Measure the voltage between the circulation pump's black and blue wire connectors. You should get 220-240 VAC.

3) If you do not read any voltage, replace the circulation pump fuse (F3) on the PC board.

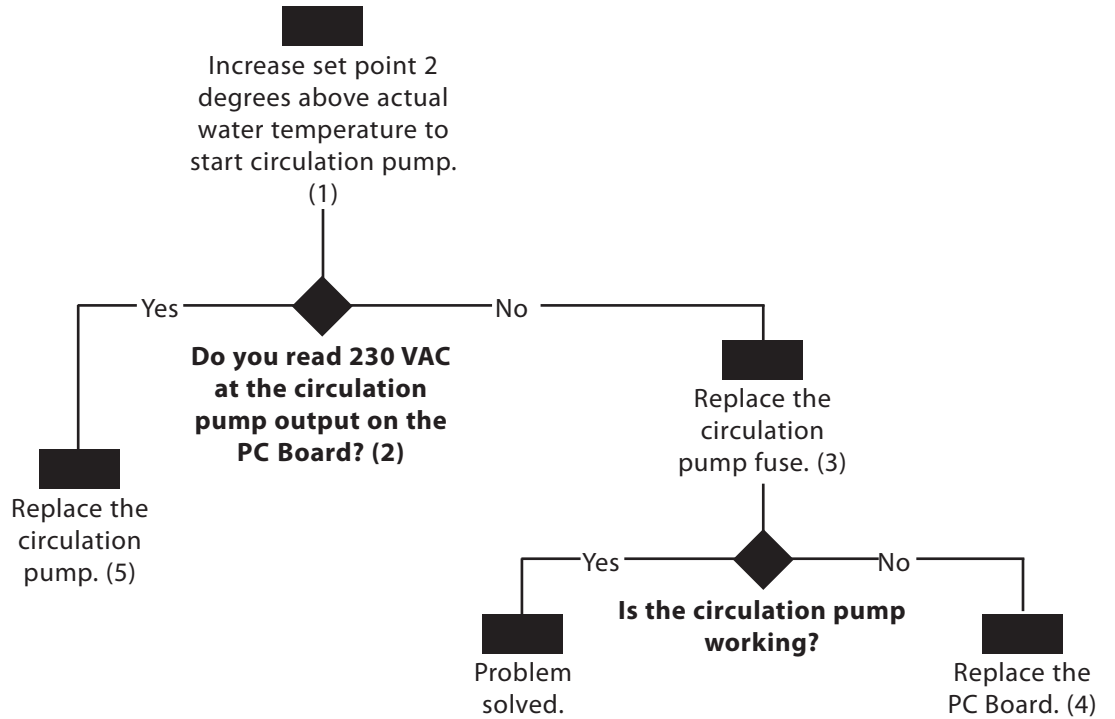
For the exact location, please refer to the wiring diagram inside pack lid.

4) If the problem persists, replace PC board.

5) If voltage is correct, replace the circulation pump.

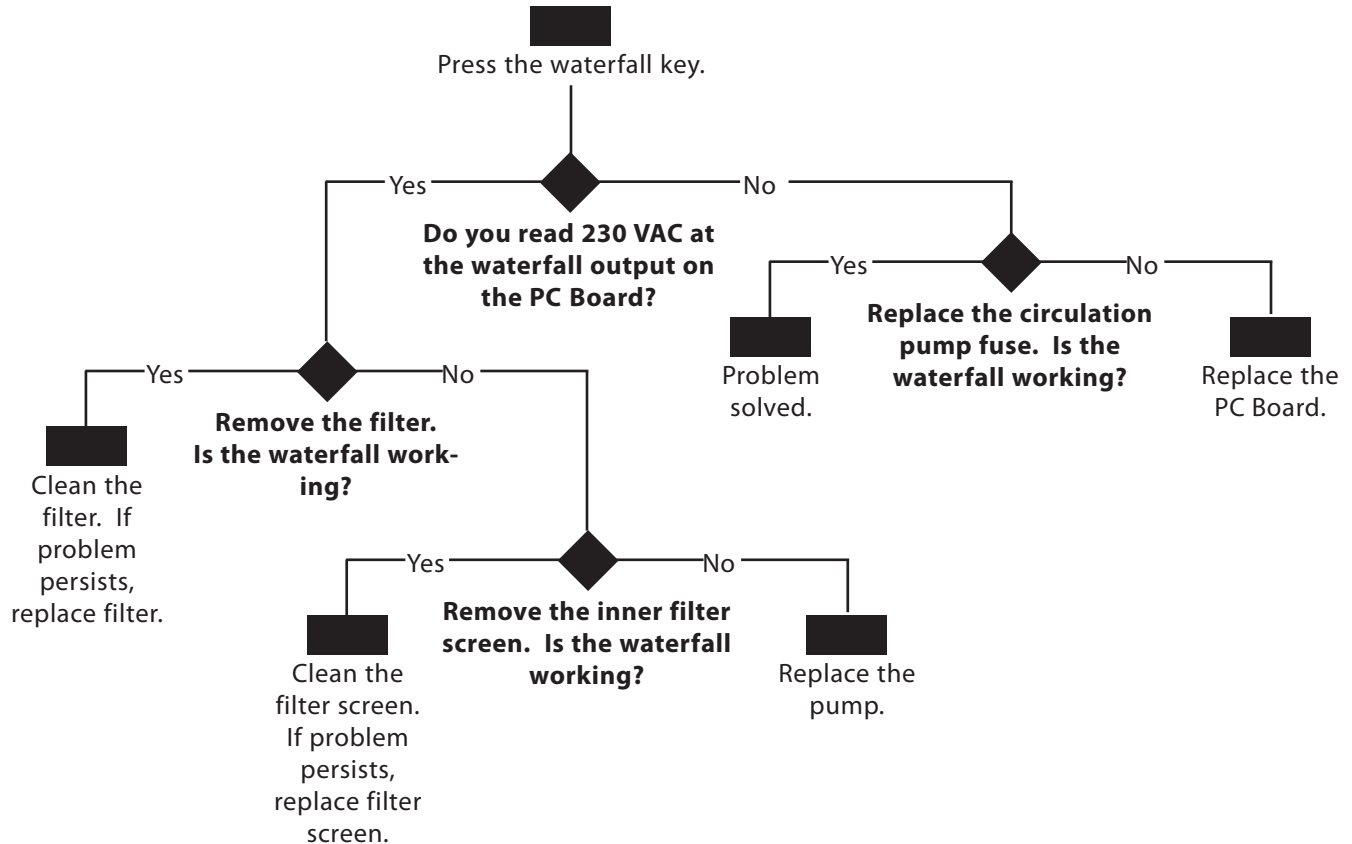
# Circulation Pump Flow Chart

If the circulation pump does not work, follow this troubleshooting flow chart to identify the source of the problem:



# Waterfall Does Not Work

If the waterfall does not work, follow this troubleshooting flow chart to identify the source of the problem:



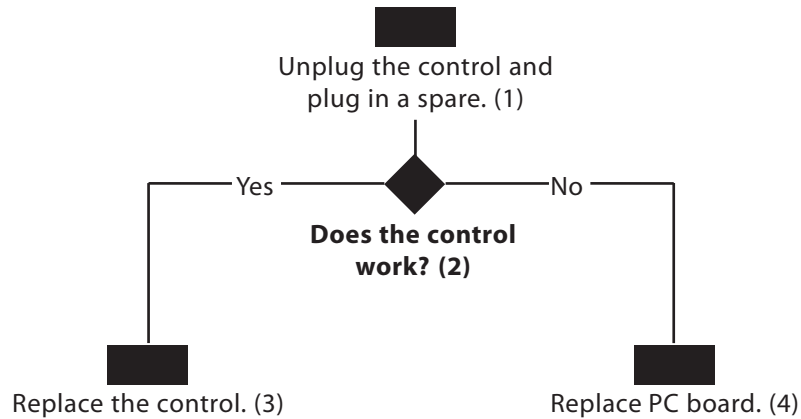
# Upper/Auxiliary Control Flow Chart

If the upper control or auxiliary control does not work, perform the following steps to resolve the problem:

- 1) Unplug the malfunctioning control and plug in a spare one. Refer to wiring diagram on inside pack lid for exact location of the plug.
- 2) Check to see if spare control is responding.
- 3) If the control works, replace the upper control.
- 4) If the control still does not work, replace the PC board.

# Upper/Auxiliary Control Flow Chart

If the upper control or auxiliary control does not work, follow this troubleshooting flow chart to resolve the problem:





# Fan Does Not Work

**The cooling fan prevents the system from overheating when the ambient air temperature is too high. The fan starts when the air temperature inside the control can exceeds 65°C.**

**The sensor for the Smart Winter Mode is used to determine the temperature in the enclosure. The fan is on when either of these conditions occurs:**

**1) Temperature in the enclosure has reached 65°C and is cooling to 60°C.**

**2) A pump is or was on during the last hour.**

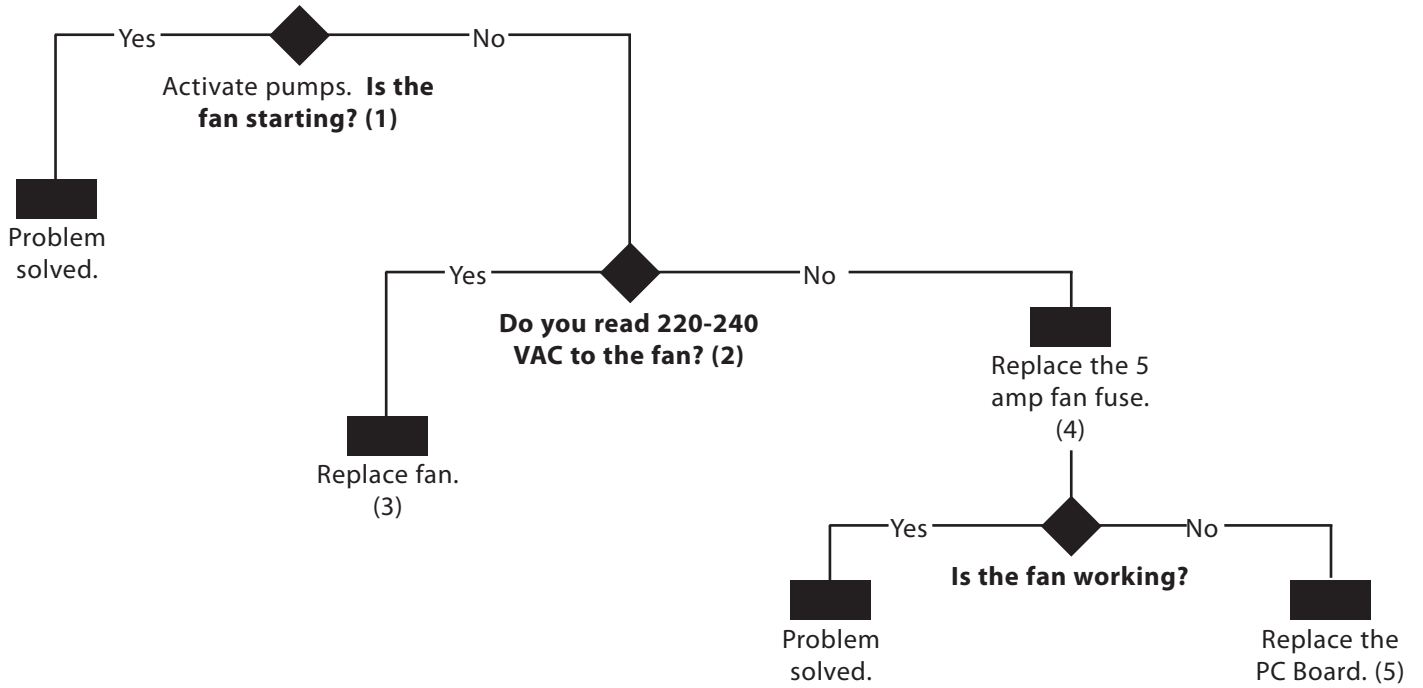
**Both conditions are independent. Thus, if the fan is turned on because of the pump and temperature has not reached 65°C one hour after the pump is turned off, the fan will turn off even if temperature is between 60°C and 65°C.**

If the cooling fan is not working, perform the following steps to correct the problem:

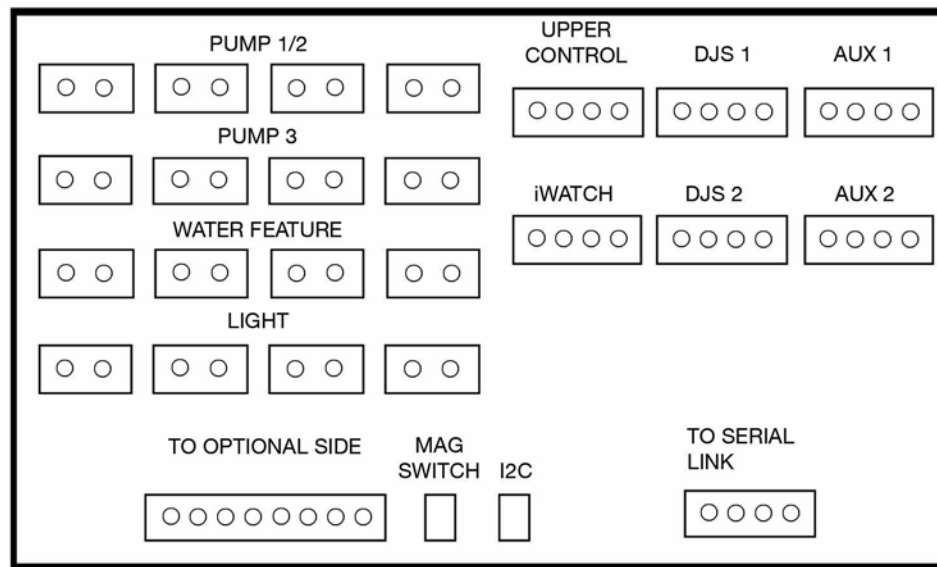
- 1) Open the lower control can cover. Turn on a pump. The fan should start within one minute.
- 2) If the fan does not start, measure the voltage between the blue and brown wire connectors on the board. You should get 220-240 VAC.
- 3) If the voltage reading is good, replace fan.
- 4) If the voltage reading is not good, replace the 5 amp. fan fuse.
- 5) If the fan still does not work, replace the PC board.

# Fan Flow Chart

If the fan does not work, follow this troubleshooting flow chart to resolve the problem:



# Magnetic Switches

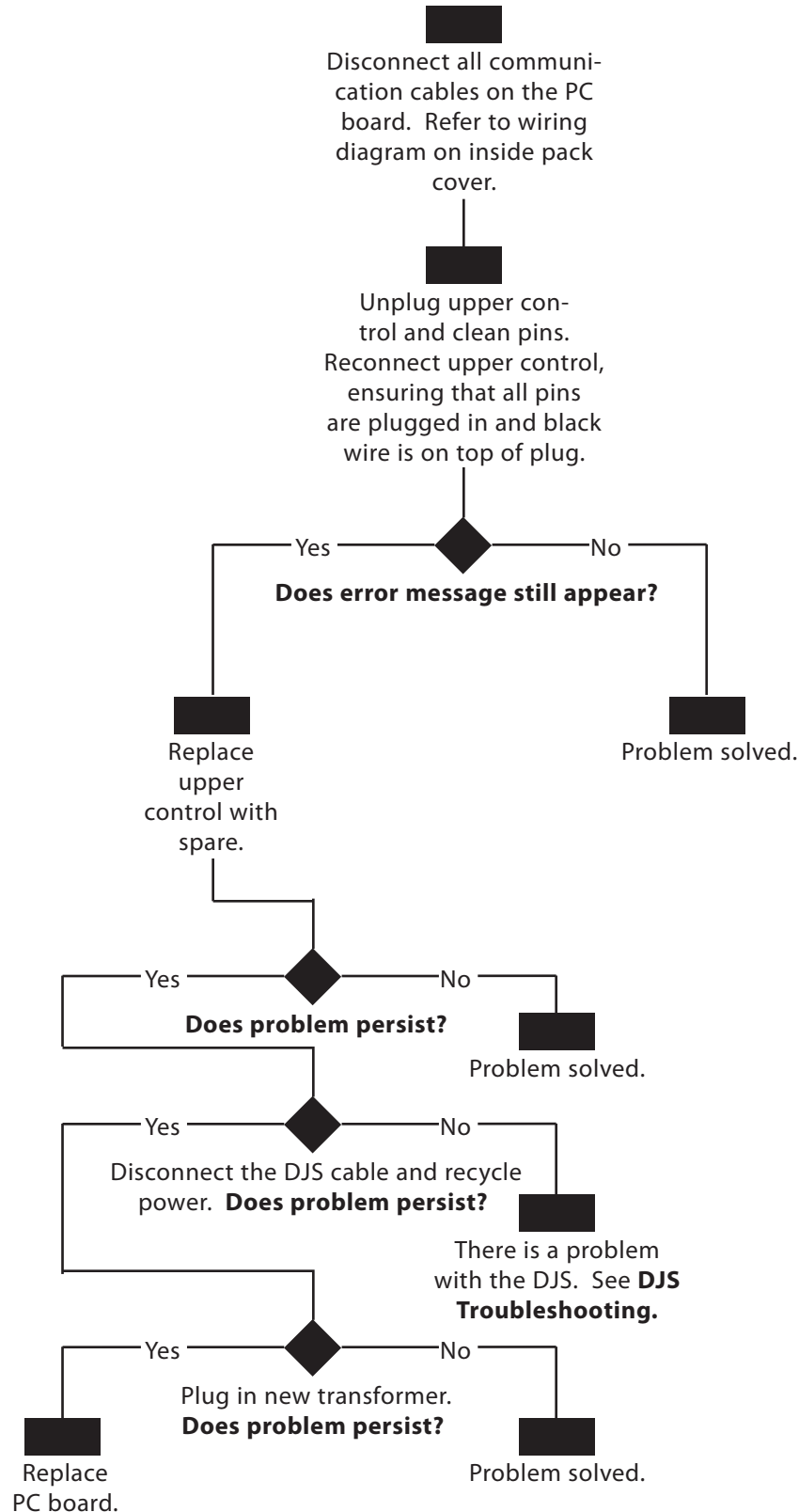


When the magnetic switch is pressed, it works in the same manner as the pump button on the upper control. This feature is to replace the TSC-17.

**NOTE: If you plug the magnetic switches, it will be impossible to plug the TSC-17.**

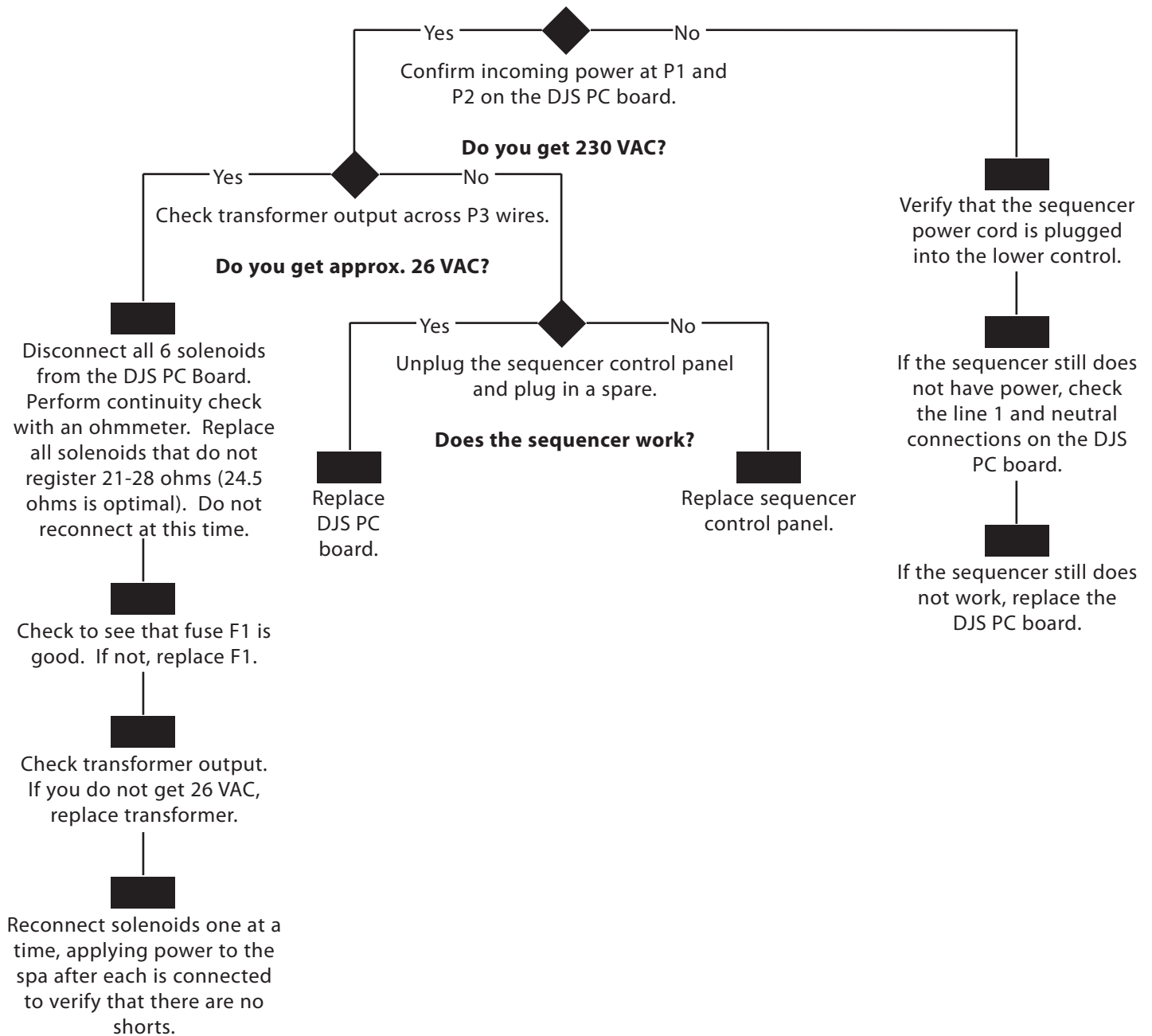
# Communication Error Flow Chart

If the display is frozen or displaying a communication error, follow this troubleshooting flow chart to resolve the problem:



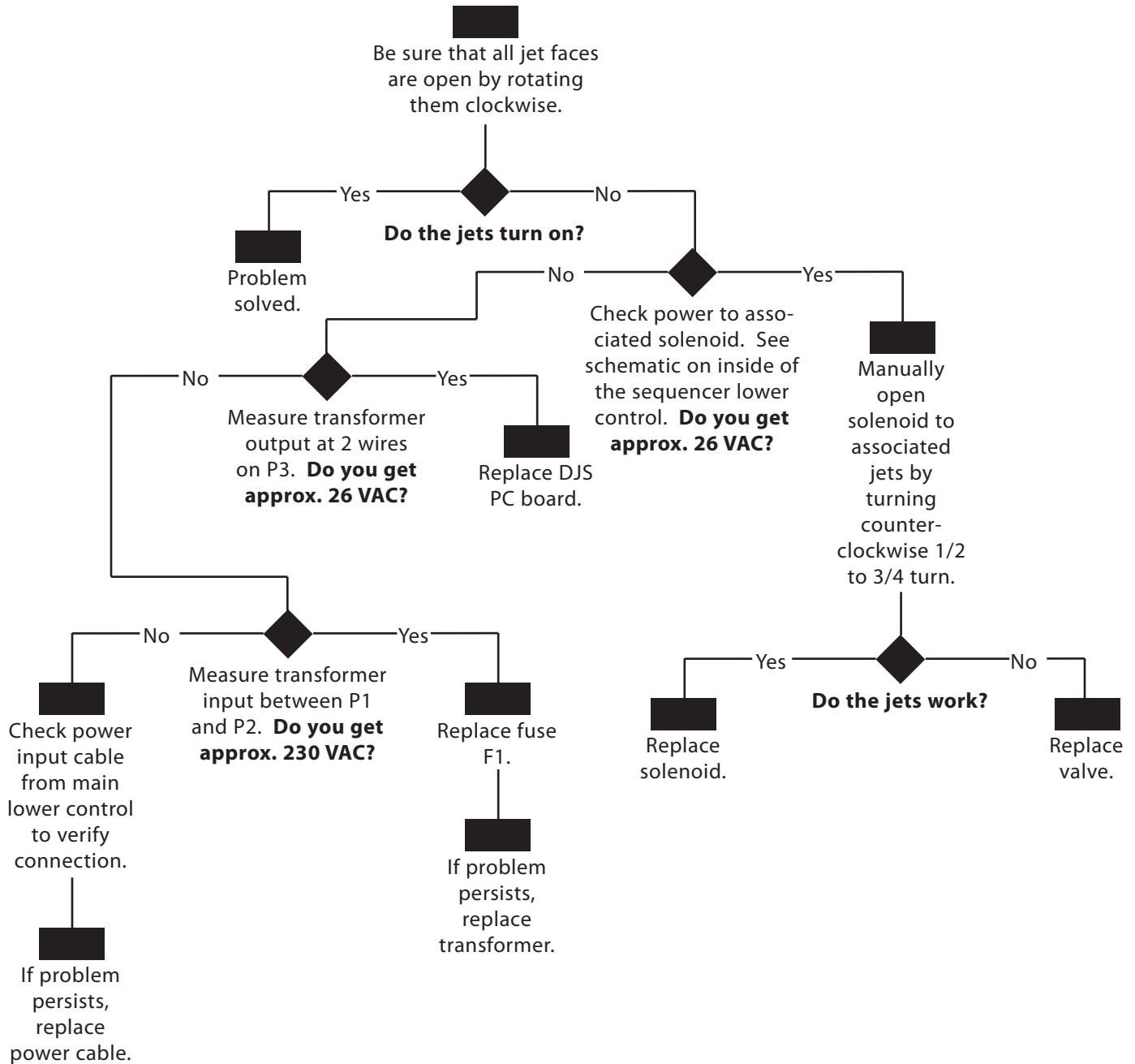
# Massage Sequencer Does Not Work

If no functions on the massage sequencer control panel are working, follow this troubleshooting flow chart to resolve the problem:

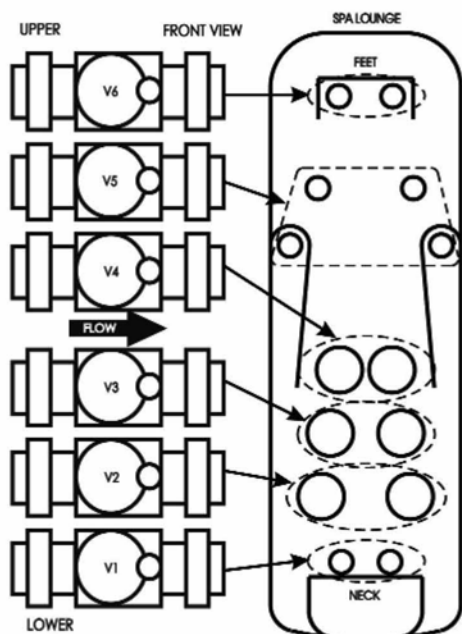
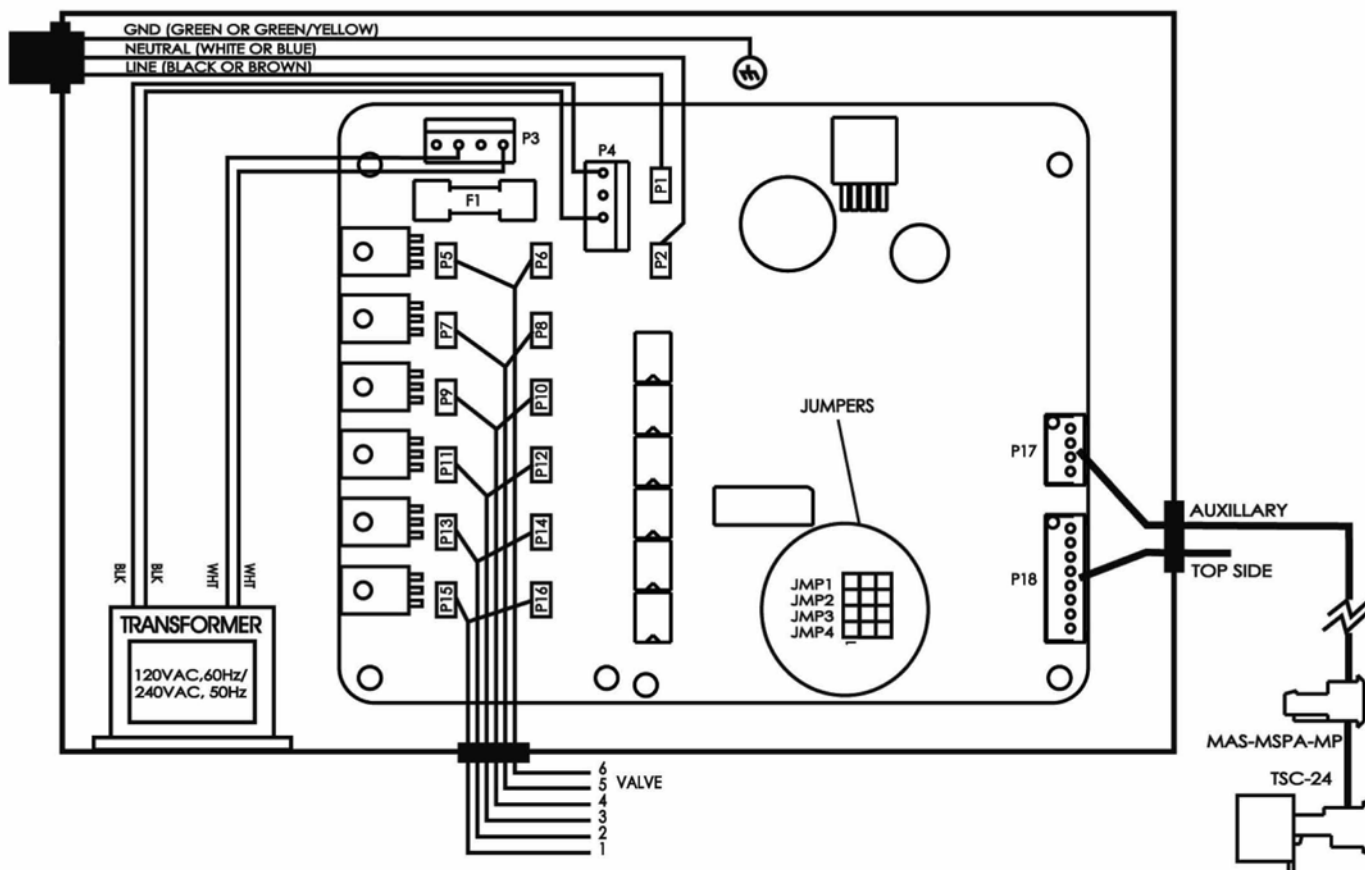


# Message Sequencer Jets Not Working

If the message sequencer jets are not working, follow this troubleshooting flow chart to resolve the problem:



# DJS Wiring Diagram



## JUMPER SETTINGS

JMP1	<input type="checkbox"/> = VALVE TIMING 2 SEC.	<input type="checkbox"/> = VALVE TIMING 4 SEC.
JMP2	<input type="checkbox"/> = PUMP #1	<input type="checkbox"/> = PUMP #2
JMP3	<input type="checkbox"/> = STANDARD ADDRESS	<input type="checkbox"/> = SECOND ADDRESS
JMP4	<input type="checkbox"/> = NOT USED	<input type="checkbox"/> = NOT USED

# iWatch Installation

You will need the following tools to complete the installation:

- Electric drill
- 1 1/4" hole saw
- 1/4" drill bit
- Phillips screwdriver
- Masking, duct or packaging tape
- Spring-loaded punch or other tool that can be used to mark drilling locations, such as a hammer and nail

The following parts are included in the iWatch Master Unit kit:



- iWatch Master Control module (01560-360)



- iWatch power cable (01560-622)



- iWatch data cable (01560-620)



- iWatch template (01560-381)



- 2 cable ties - 4" black (01200-006)



- 2 cable ty-mounts (01500-005)



# iWatch Installation

## REMOVE SPA PANEL

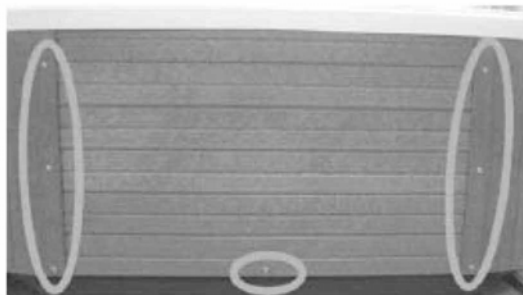


Possible Electrical Shock Hazard!  
Make sure the power to the spa is **OFF**.

- 1) Turn off the main spa circuit breaker located in the disconnect box or house panel.
- 2) Verify that all power has been turned off before continuing installation.  
Refer to the spa service manual to determine how to confirm that all power to the spa has been turned off.
- 3) Locate the spa's upper control.



The lower control box is located in an equipment compartment behind the spa panel below the upper control.

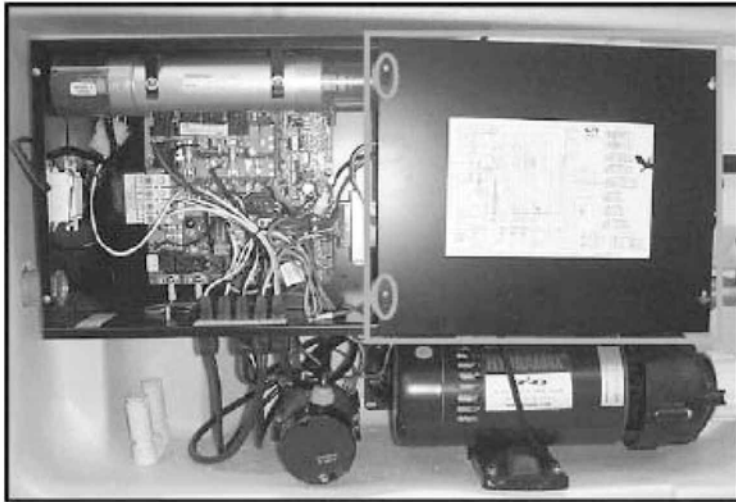


- 4) Use the screwdriver to remove the spa panel screws. The number of screws to be removed will depend on the make and model of spa. Remove the panel to expose the equipment compartment.

# iWatch Installation

## REMOVE LOWER CONTROL BOX LID

1) Locate the spa lower control box and use the screwdriver to loosen the screws slightly and remove the lid. You do not need to remove the screws completely; just lift the lid slightly to remove it.



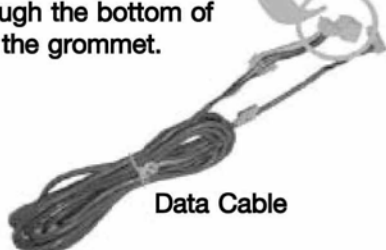
You can hang the lid on the edge of the lower control box using the left-most holes on the lid to attach the lid to the rightmost screws on the box.

2) Find the iWatch master control data cable and connect it to the spa lower control box circuit board as follows:

a) Feed the double-connector end of the iWatch master data cable up through the bottom of the grommet in the lower right corner of the lower control box.



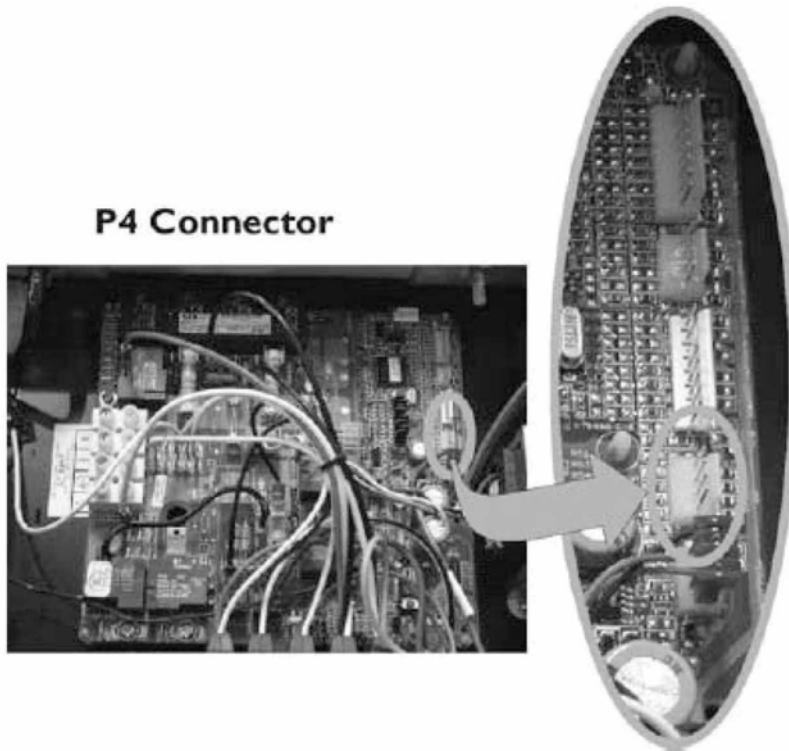
Route data cable up  
through the bottom of  
the grommet.



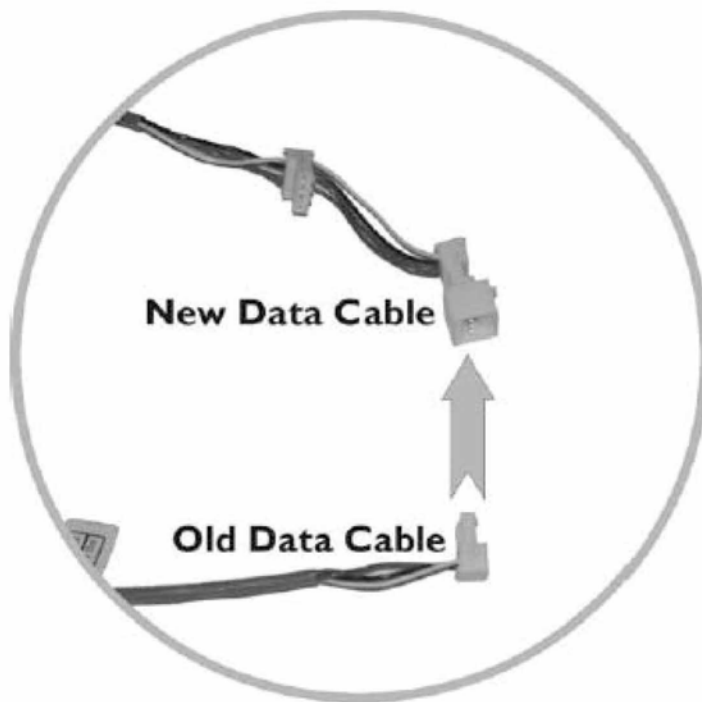
Data Cable

# iWatch Installation

b) Unplug the existing data cable from the P4 connector on the main circuit board.

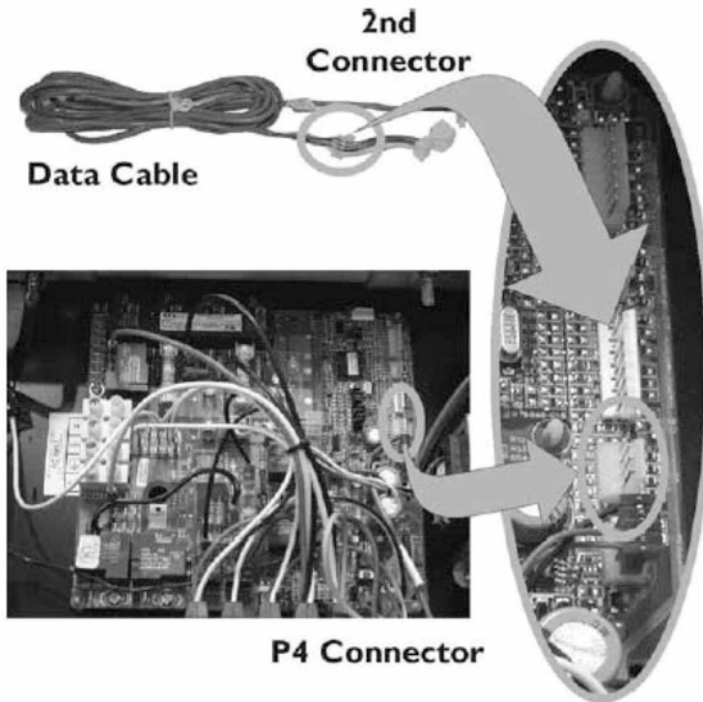


c) Connect the old data cable to the special female connection on the double connector end of the new iWatch data cable. Be sure to press the old cable into the connector until it clicks into place. Failure to do so could result in a loss of data flow to the spa's upper control.



# iWatch Installation

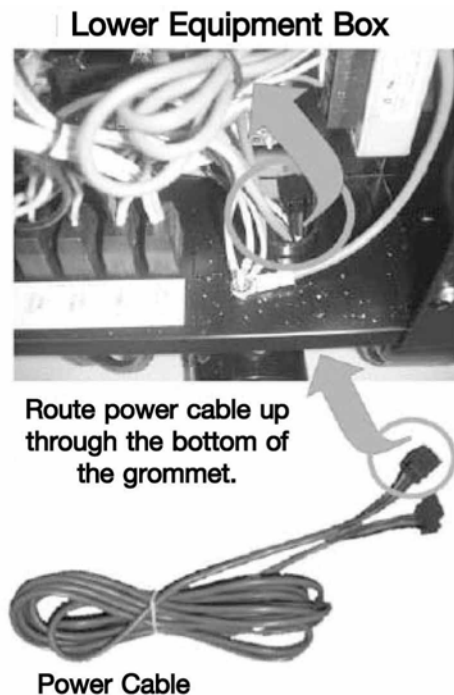
d) Connect the male connector on the double-connector end of the cable to the P4 connector on the main circuit board.



The single-connector end will be connected to the iWatch master control module once it has been mounted on the spa panel.

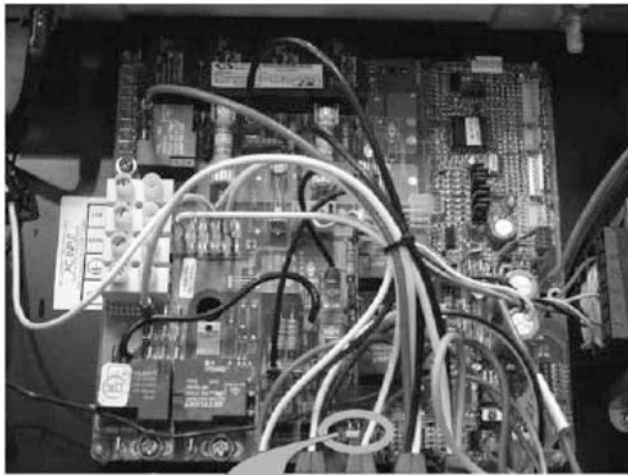
3) Find the iWatch master control power cable and connect it to the spa lower control box circuit board as follows:

a) Feed one end of the iWatch master control power cable up through the bottom of the grommet in the lower right corner of the box.

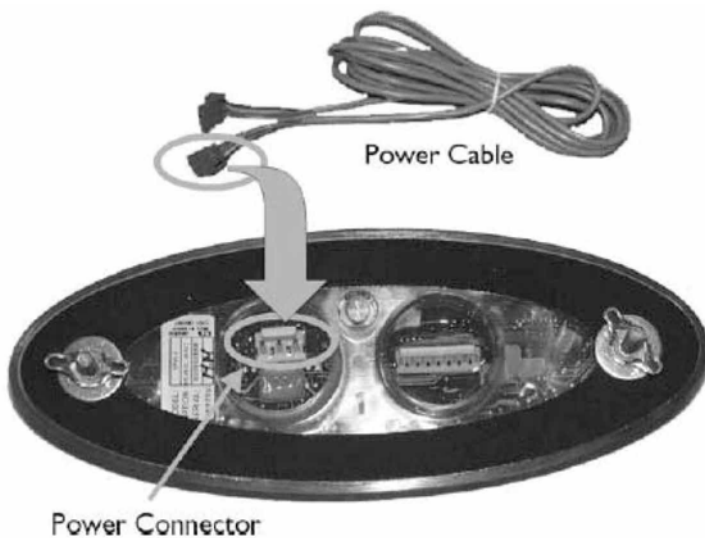


# iWatch Installation

b) Connect the end of the iWatch master control power cable to the P13 connector on the master circuit board.



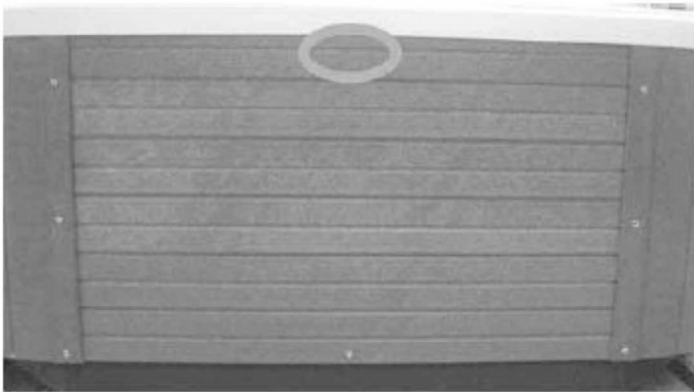
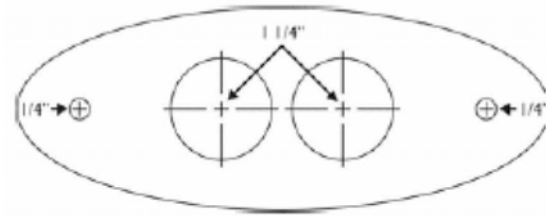
4) The power connection to the spa's lower control box is now completed. The other end of the power cable will be connected to the iWatch master control module after you complete mounting it to the spa panel.



# iWatch Installation

## MOUNTING iWATCH MASTER CONTROL USING THE MASTER CONTROL TEMPLATE

1) Locate the iWatch master control module template in the installation kit.

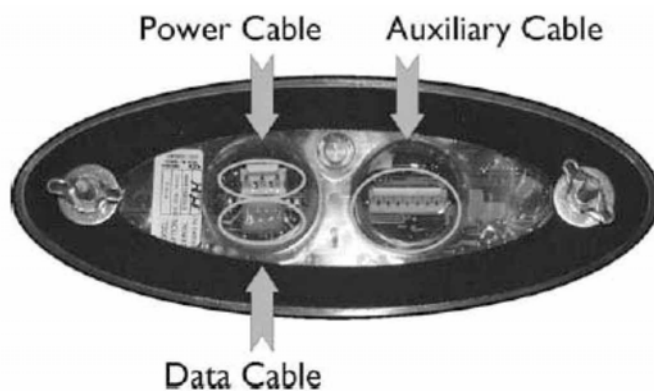


This is typically in a location where the iWatch master control module is also easily visible from a desired monitoring location, such as a patio or a house window.

3) Mark the center of the drill holes using a spring loaded punch, or a hammer and nail. Then remove the template and drill the holes. Start with the 1/4" holes.

4) After all the holes have been drilled, position the iWatch master control module over the holes and use the washers and wing nuts to secure the module to the panel.

5) Connect the cable as indicated below:



The auxiliary cable will only be connected if you are installing an optional iWatch auxiliary module. Use the same procedures to mount the auxiliary unit on another side of the spa. Route the data cable under the spa lip around to the master module and plug it into the auxiliary cable port on the master unit.



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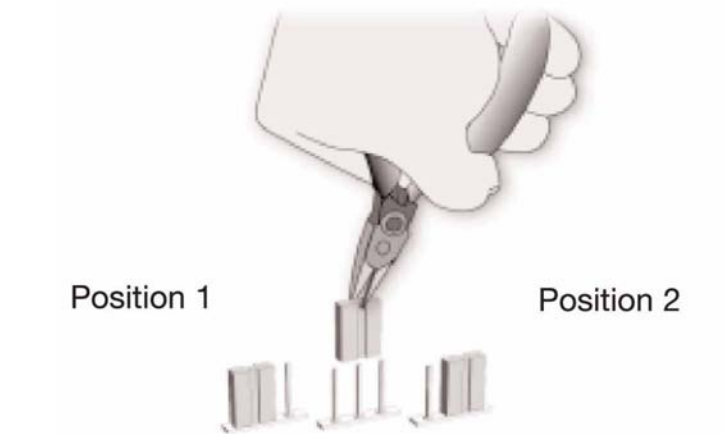
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# Jumpers







Certain SSPA spa pack parameters can be modified by changing the position of jumpers on the board.

**Please check wiring diagram on the inside of the pack cover to verify specific functions for your pack. To access jumpers, first remove SSPA power box cover.**



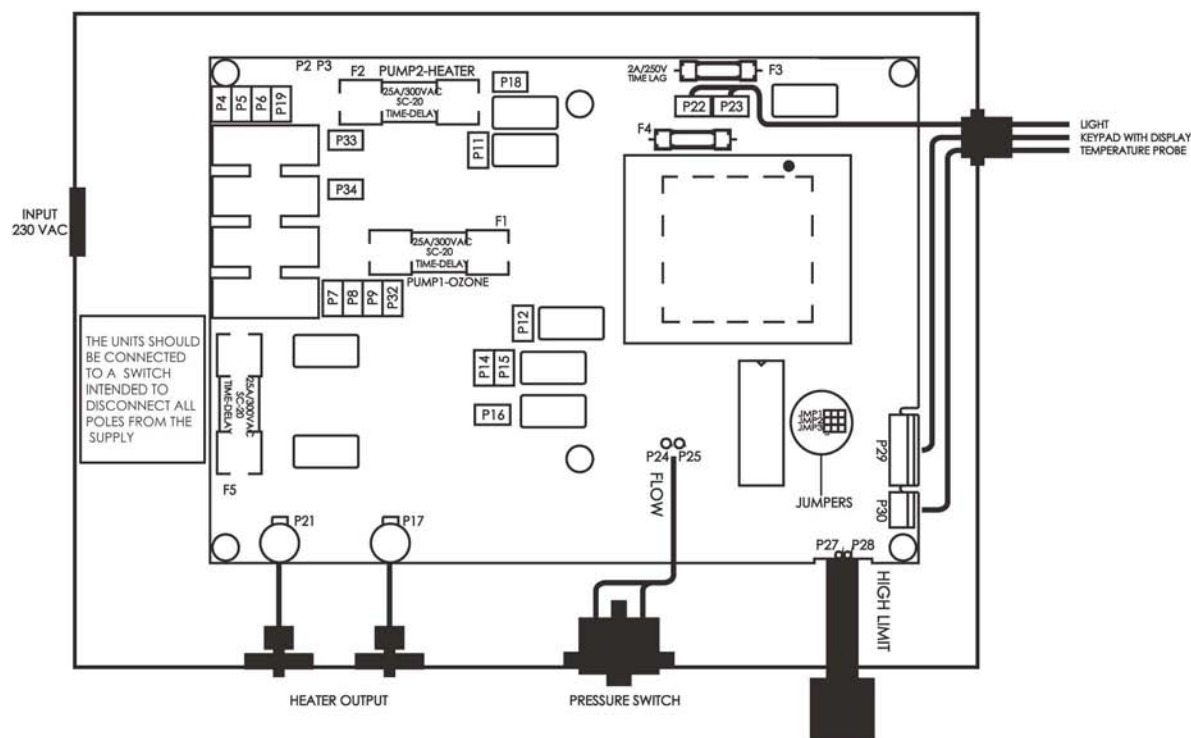
To change a setting simply pull the cover off and replace it in the desired position.

## Jumper Settings (CE)

JMP 1		1 X 32 A (install jumper via wire P33, P34) or 2x16 A (remove jumper wire P33,P34) Connect phases 1&2 on lines 1&2		1X16A
JMP 2		No Circ. Pump		with circ. pump
JMP 3		Single Pump System		Dual pump system - not valid for 1x16 A



# Wiring Diagram - SSPA-MP-D13-CE



## Pump 1 (Dual Speed)

Voltage	230V
White / Blue	P7
Black / Low Spd	P14
Red / High Spd	P12
Green / Ground	P4

## Circulation Pump

Voltage	230V
White / Blue	P32
Black / Line	P18
Green / Ground	P19

## Heater

Voltage	230V
Line	P21
Neutral	P17
Green / Ground	

## Pump 2

Voltage	230V
White / Blue	P9
Red / Line	P11
Green / Ground	P6

## Ozone

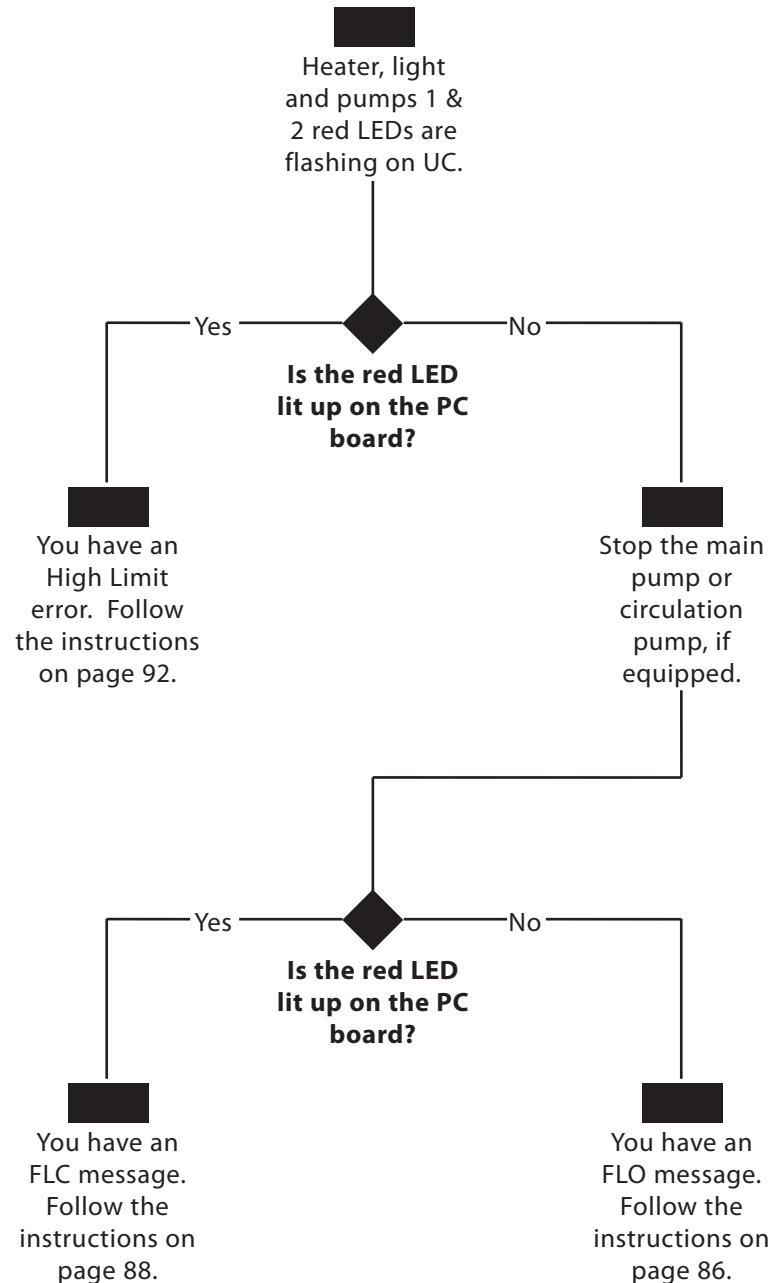
Voltage	230V
Blue / Com	P8
Brown / Line	P16
Green / Ground	P5

## Light

White / 0 VAC	P23
Black / 12 VAC	P22

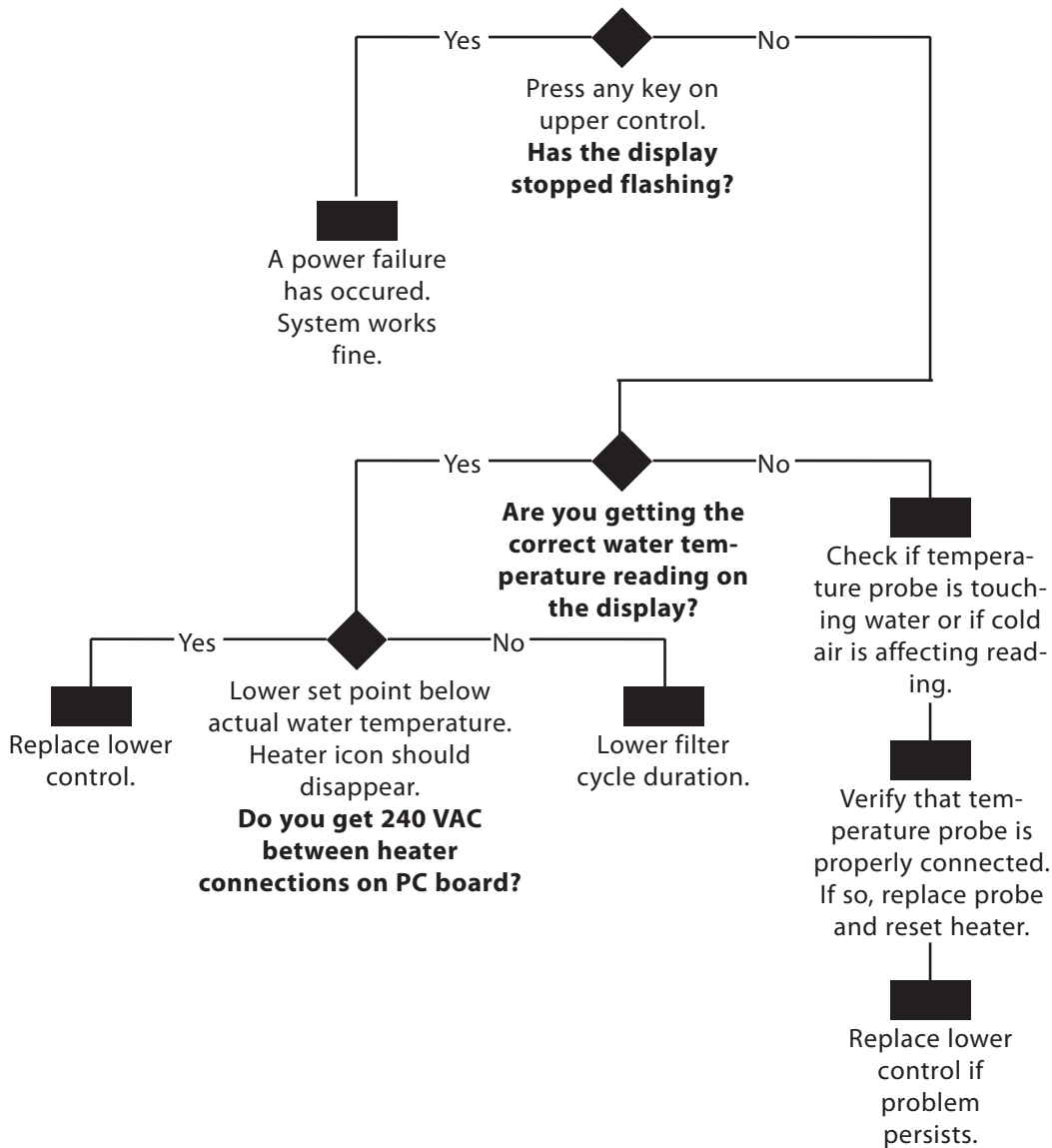
# Flashing LEDs Flow Chart

If LEDs are flashing on the upper control, follow this troubleshooting flow chart to resolve the problem:



# Display Flashing Flow Chart

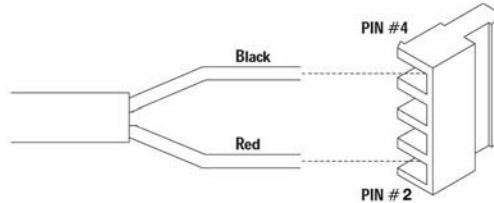
If the system detects a temperature of 44°C or higher, the display will start flashing. Follow this troubleshooting flow chart to resolve the problem:



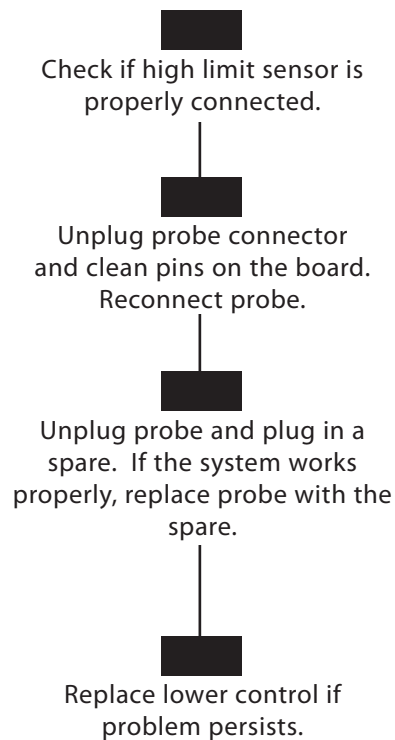
# Wrong Temperature Flow Chart

On SSPA-NE packs, the system will display the wrong temperature if it detects that the temperature is not within normal limits. Follow this troubleshooting flow chart to resolve the problem:

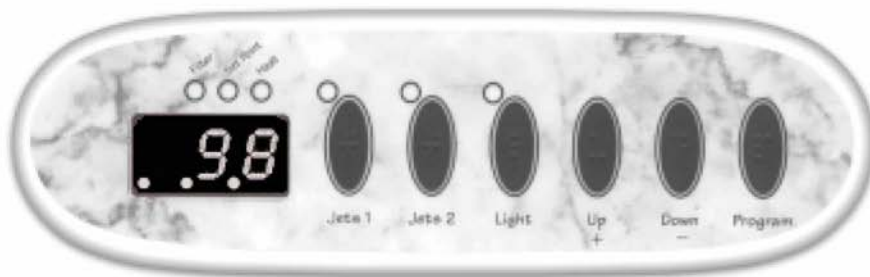
Make sure to use the right probe!  
MSPA-1 probe does not work on an SSPA pack.  
Probe wires should be in this order:



Press any key after each step to reset the system.



# FLO Error Message



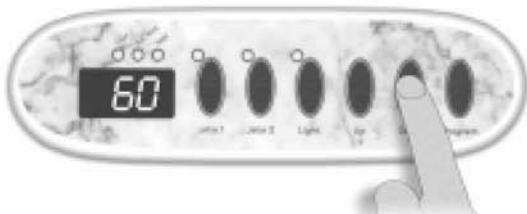
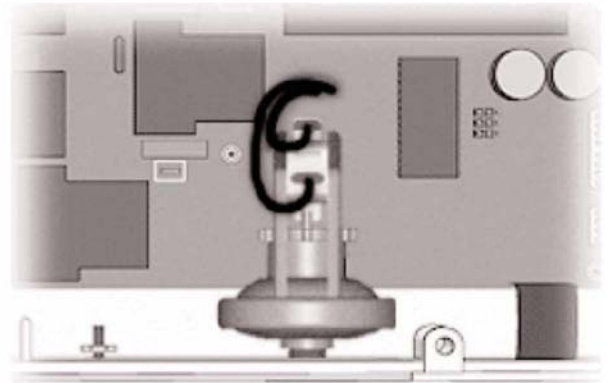
A FLO error message indicates a pressure switch problem. If the system does not detect any pressure when the pump is manually or automatically turned on, a FLO error message will appear on the keypad display.

There must be enough water in the spa for normal operation. A FLO error message may appear if the spa filter is dirty or if something restricts the flow of the water in the piping. The heater will automatically shut down when a FLO error message appears.

Make sure that jumpers 2 and 3 are properly configured.

**Power may remain on when these steps are carried out.**

- 1) Verify that the pump is working. If the pump is not working, refer to **Pump Does Not Work** on page 97.
- 2) Clean the filter and check for air blockages, closed trap valves or anything that could be restricting water flow.
- 3) Verify that the pressure switch cable is properly connected to the pressure switch.

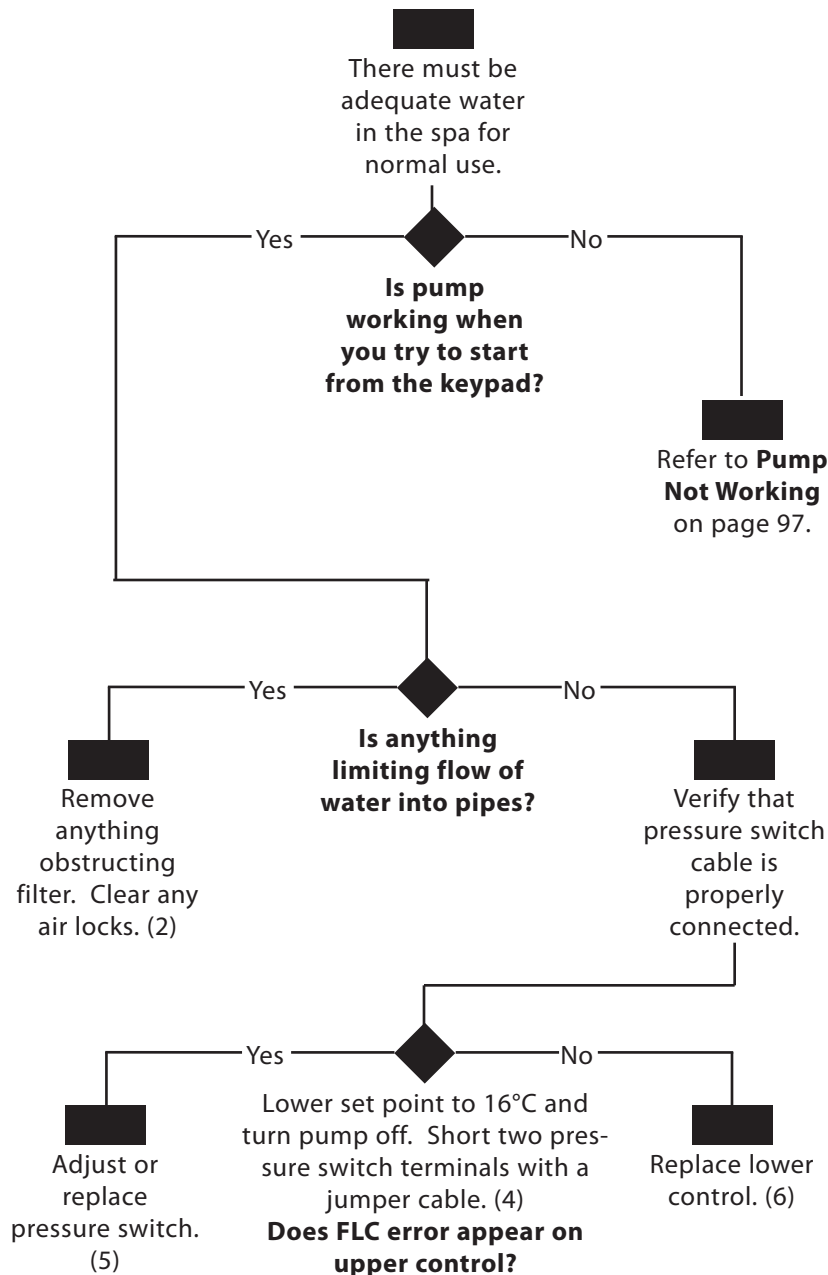


- 4) Lower the set point to 16°C by pressing on the down arrow key. This will turn the pump off. Short the two pressure switch terminals with a jumper cable.
- 5) If three flashing LEDs appear on the upper control, the pressure switch is the source of the problem. Try to adjust the pressure switch. Refer to **How to Adjust the Pressure Switch** on page 105. If adjustment does not solve the problem, replace the switch.
- 6) If no error code appears on the upper control, the cable or the board are causing the problem. Replace the lower control.

# Flow Switch Open (FLO) Flow Chart

If there is a flow switch open (FLO) error, follow this troubleshooting flow chart to resolve the problem:

**Make sure jumpers 1 and 2 are properly configured.**

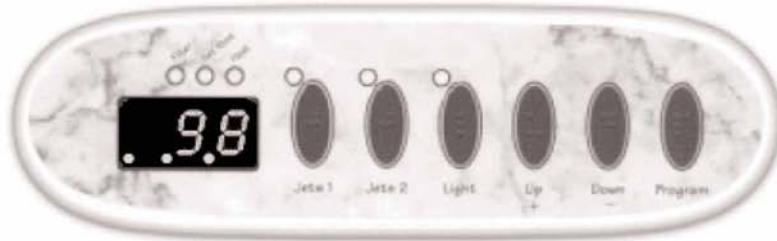




# FLC Error Message

An FLC error message (3 flashing LEDs) indicates a pressure switch problem. If the system detects any pressure when the pump is off, an FLC error message will appear on the upper control.

**Make sure the circulation pump parameter is set correctly, depending on your system configuration.**

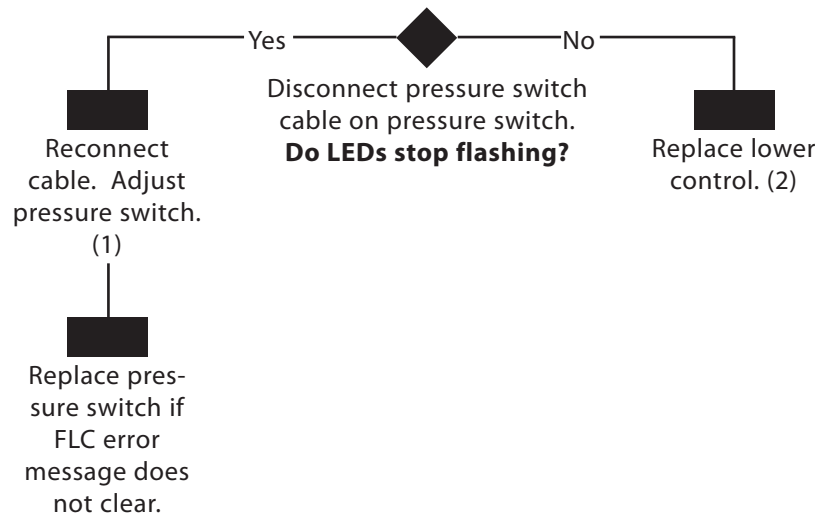


**Power may remain on when the following steps are carried out.**

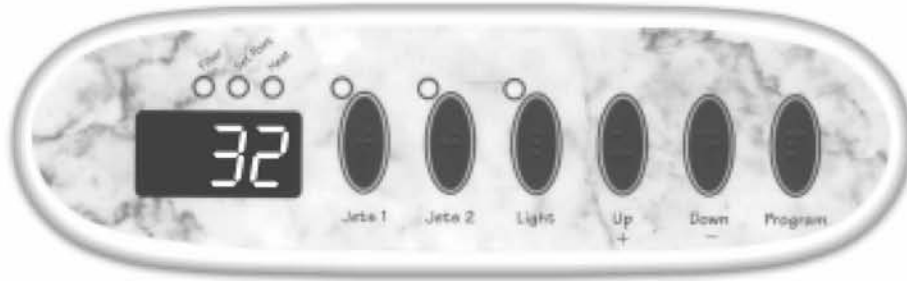
- 1) Disconnect the pressure switch cable from the pressure switch. If an FLO error message is displayed when the pump is started, adjust the pressure switch. Replace the switch if adjustment fails to resolve the problem. See **How to Adjust the Pressure Switch** on page 105 for more info.
- 2) Replace the lower control if an FLO error message is not displayed on the upper control.

# Flow Switch Closed (FLC) Flow Chart

If you have determined that there is a flow switch closed error, follow this troubleshooting flow chart to resolve the problem:

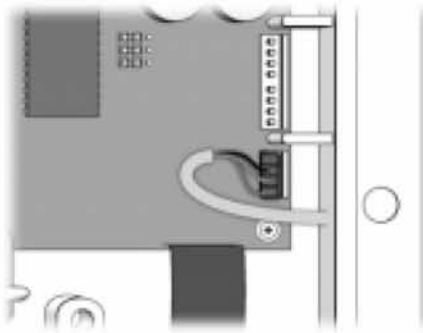


# Temperature Probe (0° Error)

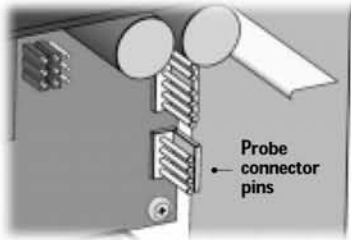


**Note that the water temperature must be over 2°C in order to carry out the following steps.**

Press any key after each step to reset the system. **Power may remain on.**



1) Verify that the temperature probe is properly connected.



2) Disconnect the probe connector and clean the probe connector pins. Even a small coating of film may cause a bad connection.

3) Reconnect probe. If temperature probe error message is still displayed on the upper control, plug in a spare probe and place the probe head directly in the water. If the error disappears, replace the probe.

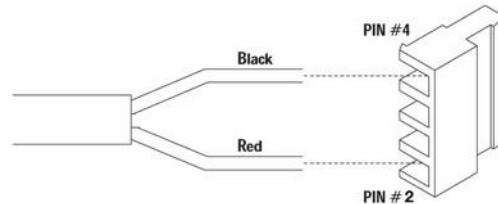
4) Replace lower control if problem persists.

# Temperature Probe (0° Error) Flow Chart

If a temperature sensor error appears on the keypad display, follow this troubleshooting flow chart to resolve the problem:

**Make sure to use the right probe! MSPA-1 probe does not work on an SSPA pack.**

**Probe wires should be in this order:  
Press any key after each step to reset the system.**



Water temperature must be over 2°C to operate.

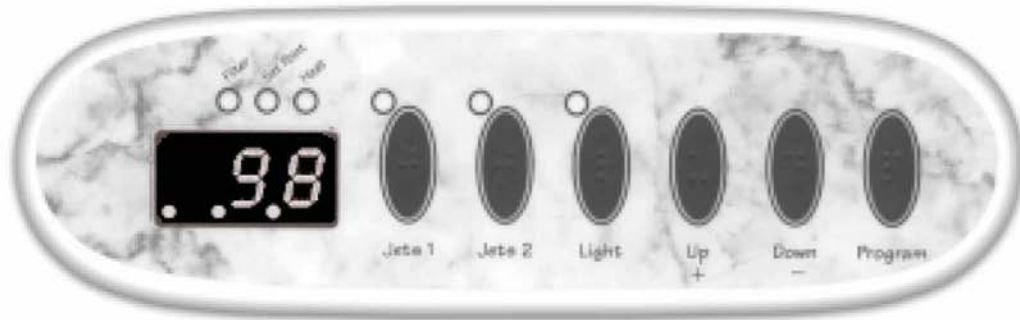
Check if temperature probe is properly connected. (1)

Unplug probe connector and clean pins on the board.  
Reconnect the probe. (2)

Replace probe with spare. (3)

Replace lower control if problem persists. (4)

# High Limit (HL) Error



In a high limit situation, the system will shut down if the temperature reaches 48°C at the heater or if the water temperature reaches 44°C in the spa.

When a high limit condition exists, a red LED light will light up on the PC board.

**Press any key between steps to reset the system. Power may remain on.**

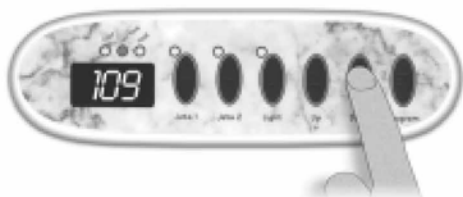
- 1) Take water temperature reading with a digital thermometer.
- 2) If the reading is below 43°C:
  - a) Check if the heater barrel feels hot. If it is hot, confirm that nothing is obstructing water flow, such as closed valves or a dirty filter.
  - b) If the heater is not hot, ensure that it is properly connected to the PC board. Try to clean the connector pins and reconnect the probe.
  - c) If HL error message continues to appear, replace lower control.
- 3) If reading is above 43°C:

Proceed to step 4 if the display shows the correct temperature.  
Proceed to step 9 if the display temperature is incorrect.

# High Limit (HL) Error

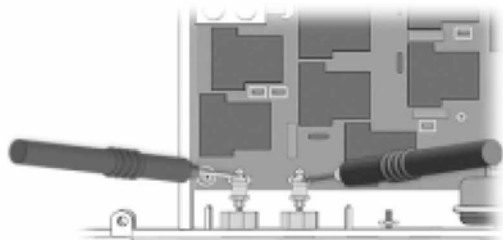
If digital thermometer water temperature reading is 43°C or higher and the keypad display shows the correct temperature, carry out the following tests:

4) If the spa is installed in an area that experiences very hot weather, remove the spa cover, even during the night. Wait until the spa cools down to replace the cover. Add cold water if necessary.



5) Lower set point below current water temperature. The heater indicator should disappear from the keypad display.

6) Open the spa pack. With a voltmeter, read the voltage



between the two heater wires on the board.

7) If you get 230 VAC, replace the lower control.

8) If you do not get 230 VAC, the pump may be overheating the water during the filtration cycle. Shorten filter cycle duration as follows:

a) Press and hold the light key for 5 seconds. The display will show a value that represents the filter cycle duration in hours.



b) Use the down arrow key to lower the number of hours. Selections range from 0 for no filtration to 12 for continuous filtration.



c) When the desired setting is displayed, press the light key again. The filter cycle will start automatically.




---

If digital thermometer water temperature reading is 43°C or higher and the keypad display does not show the correct temperature, carry out the following tests:

9) Verify that the temperature probe is in contact with water. Check that cold air from the back is not affecting the readings. Use foam to isolate the probe from cold air if necessary.

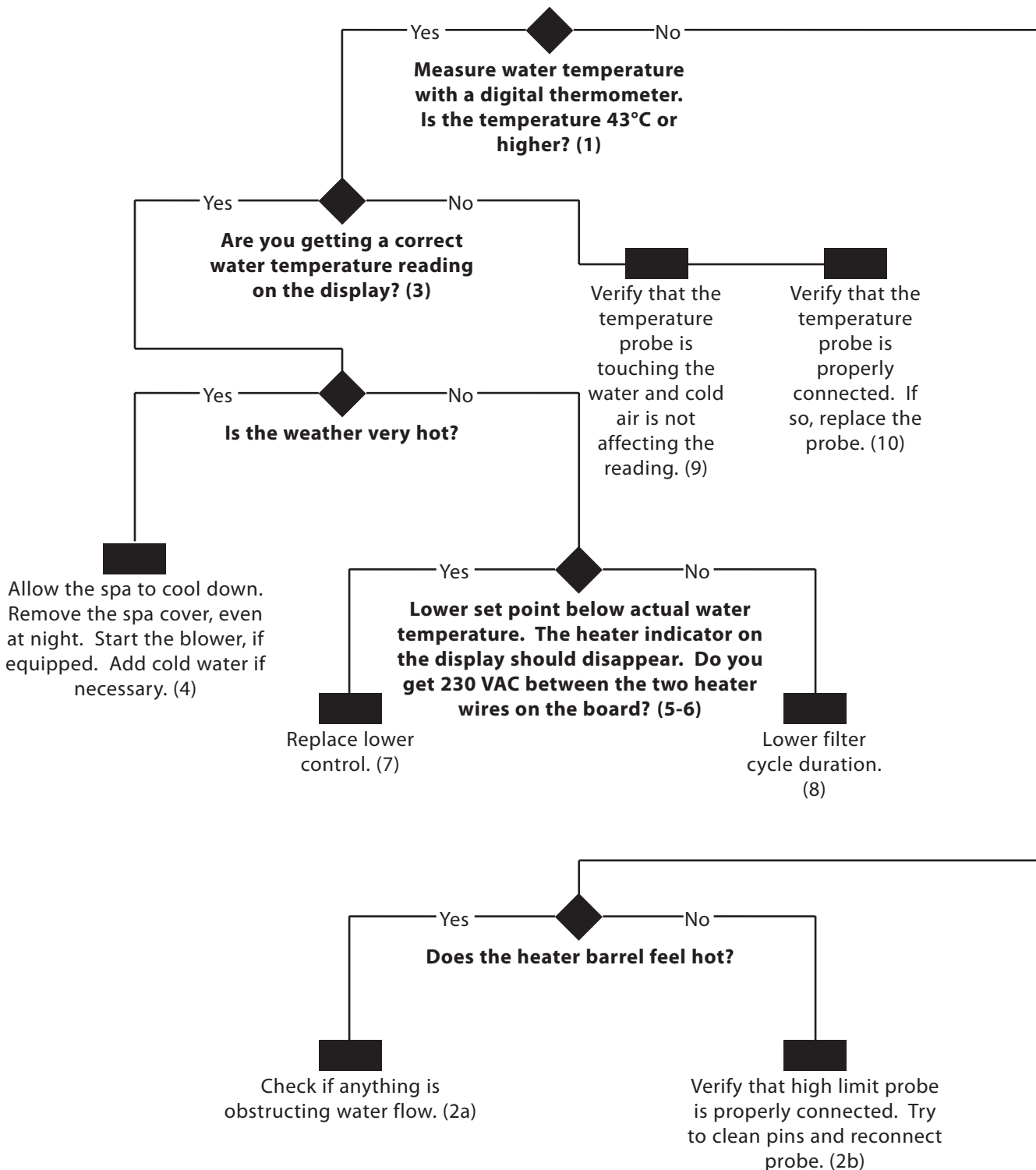
10) Make sure the temperature probe is properly connected and LED light on PC board is not lit. If both are true, replace the probe.

11) Replace the lower control if the HL error message still appears on the display.

# High Limit (HL) Flow Chart

If the spa indicates a high limit (HL) error, follow this troubleshooting flow chart to resolve the problem:

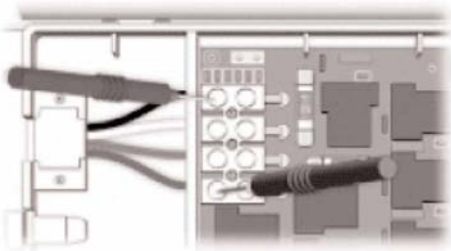
**When the spa senses an HL error, 3 LEDs will blink on the upper control and an LED on the PC board will light.**



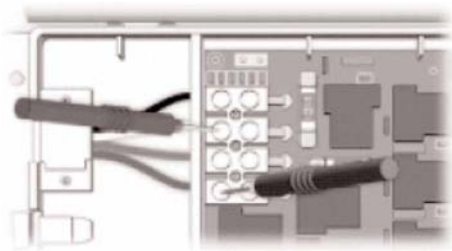
# Nothing Works

If everything is connected but nothing works, carry out the following tests to identify and correct the problem:

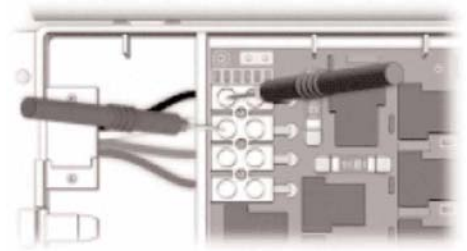
## VOLTAGE MEASUREMENTS



1) On the terminal block, measure the voltage between line 1 and line 2. You should get approximately 400 VAC, when using two lines.



2) Measure the voltage between line 1 and neutral. You should get approximately 230 VAC.

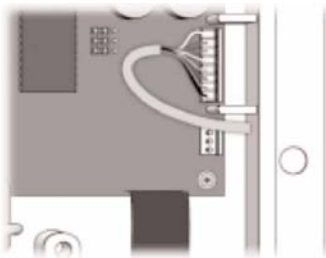


3) Measure the voltage between line 2 and neutral. You should get approximately 230 VAC.

4) Measure the voltage between neutral and ground. You should get 0 VAC.

5) If you do not get good readings, verify that the fuses are still good. If the fuses are good, there is likely an electrical wiring problem. **Call an electrician!**

## IF READINGS ARE GOOD - ALL SYSTEMS



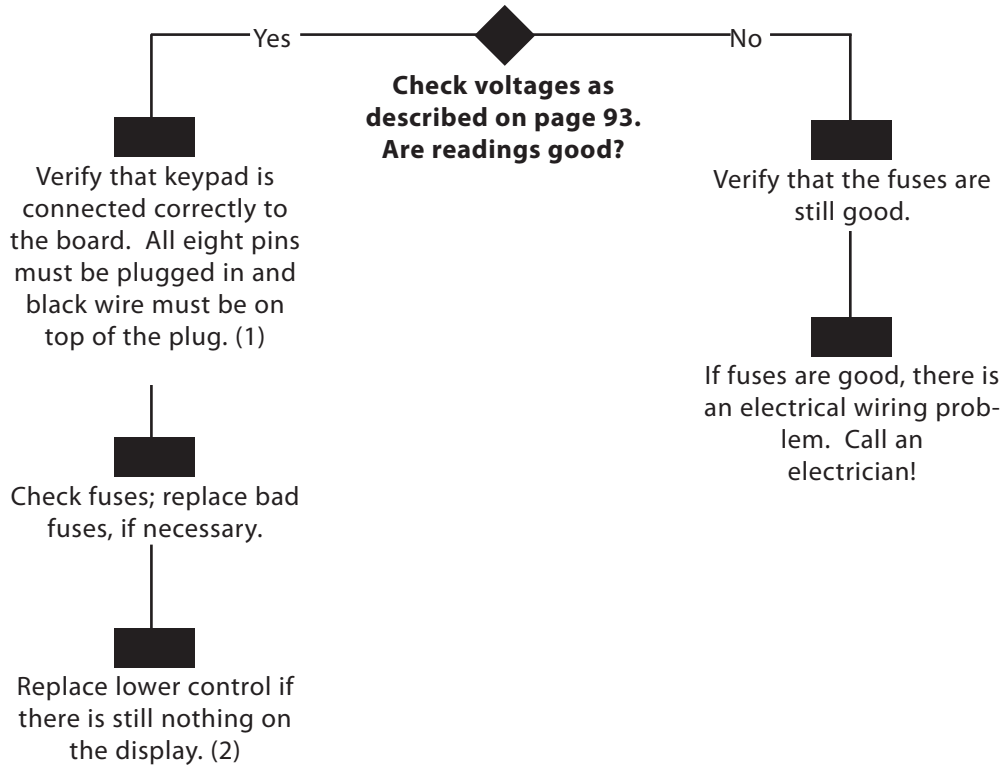
1) Verify that the upper control is correctly connected to the PC board.

2) If nothing works, replace lower control.



# Nothing Works Flow Chart

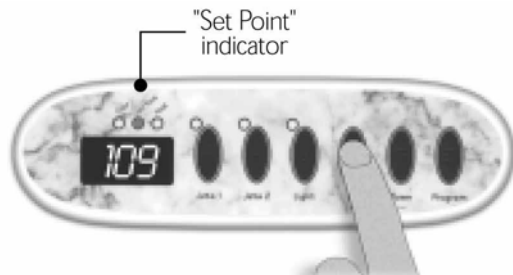
If nothing is working, follow this troubleshooting flow chart to resolve the problem:



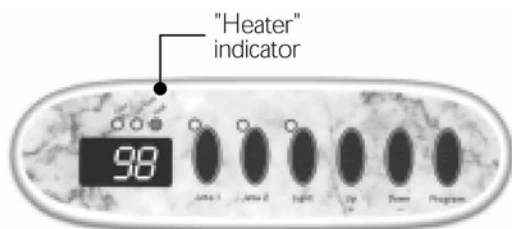
# Spa Does Not Heat

If the spa does not heat the water, follow this troubleshooting flow chart to identify and resolve the problem:

1) Check for an error message on the display. If there is an error displayed, refer to the section indicated by the error message.



2) If there is no error message, try to increase the temperature by raising the temperature setpoint. Press the up arrow key to increase the set point.

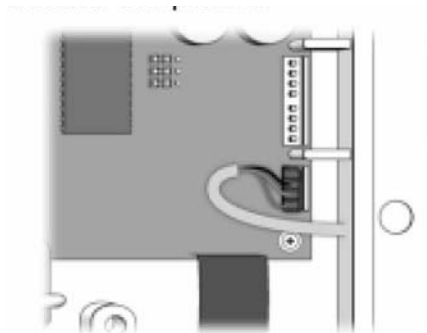


3) Verify that the heater indicator appears on the display. The heater indicator will be on when the heater is on. If will flash if more heat has been requested but the heater has not yet started.

If the indicator appears, go to step 7.  
If it does not, go to step 4.

4) If the heater indicator does not appear, use a digital thermometer to take the water temperature. Compare your reading to the value on the display.

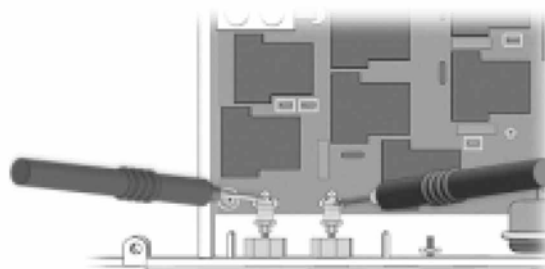
If the values are at least 2°C apart, check if the sensor is touching the water or if hot air from the back is affecting the reading. Use foam to isolate the probe if necessary.



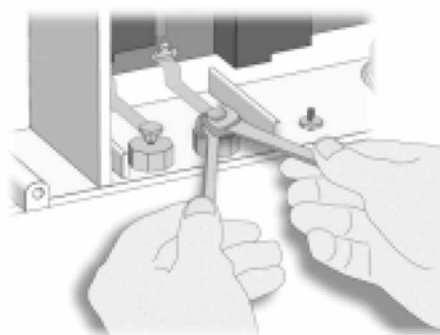
5) If no external factors are affecting the reading, replace the temperature sensor with a spare.

6) If the spa is still not heating, replace the lower control.

7) If the indicator does appear on the display, measure the voltage between the two heater screws on the board. Replace the lower control if you do not get approximately 230 VAC.



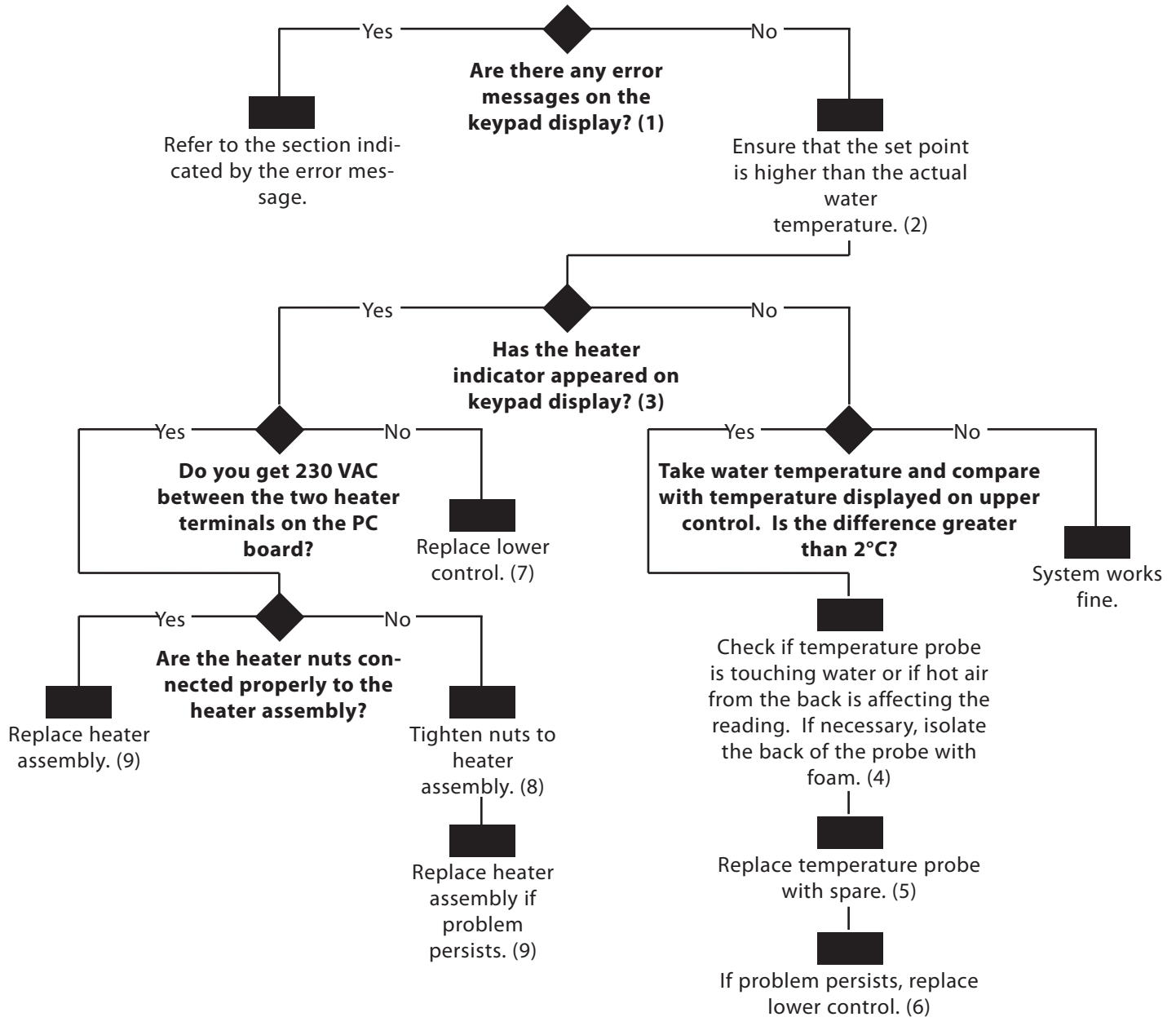
8) If the reading is good, verify that the heater nuts are properly connected to the heater assembly. Tighten the nuts if necessary. **Shut off the power !**



9) If problem persists, replace the heater assembly.

# Spa Does Not Heat Flow Chart

If nothing is working, follow this troubleshooting flow chart to resolve the problem:

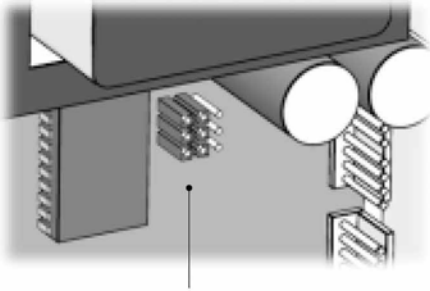


# Jet Pump Does Not Work

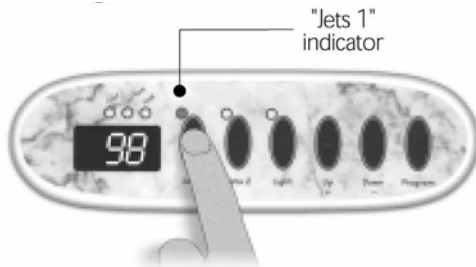
To increase the life of the relay, we use a "snubber" circuit on the pump relay. With this type of circuit, if no pump is connected to an output and relays are open, the voltmeter will continue reading around 230 VAC. This is normal.

**It is important to measure voltage when the pump is connected to the pack. Power must remain on.**

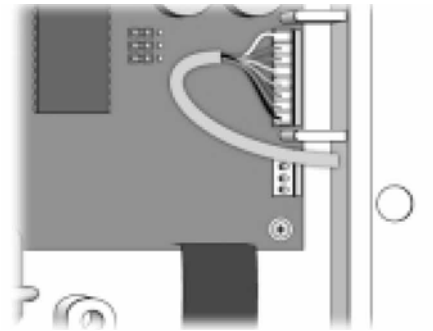
- 1) Check for an error message on keypad display. If there is one, refer to the specific section referenced by that message.



- 2) Verify that jumper 3 is set properly for one or two pumps. Refer to jumper settings section on page 80 for more info.



- 3) Check if the jets indicator appears on the keypad display when you press the jets key.



- 4) If jets indicator does not appear, use a spare keypad to check if keypad is defective. If so, replace keypad. If not, replace lower control.

- 5) If jets indicator appears when jets key is pressed, check if pump works in either speed.

# Jet Pump Does Not Work

If a pump is not working, follow these steps to correct the problem:

6) If the pump does not work in either speed, replace the pump fuse. (F1 & F2)

7) If replacing the fuse is not effective or if the pump works in one speed, take a voltage reading on the board for both speeds. (P14 & P7).

Turn the pump on in high speed and take a voltage reading between the white and red wire connectors. You should get 230 VAC. Low speed : P14 & P7 / High speed : P12 & P7

Turn the pump on in low speed and take a voltage reading between the black and white wire connectors. You should get 230 VAC.

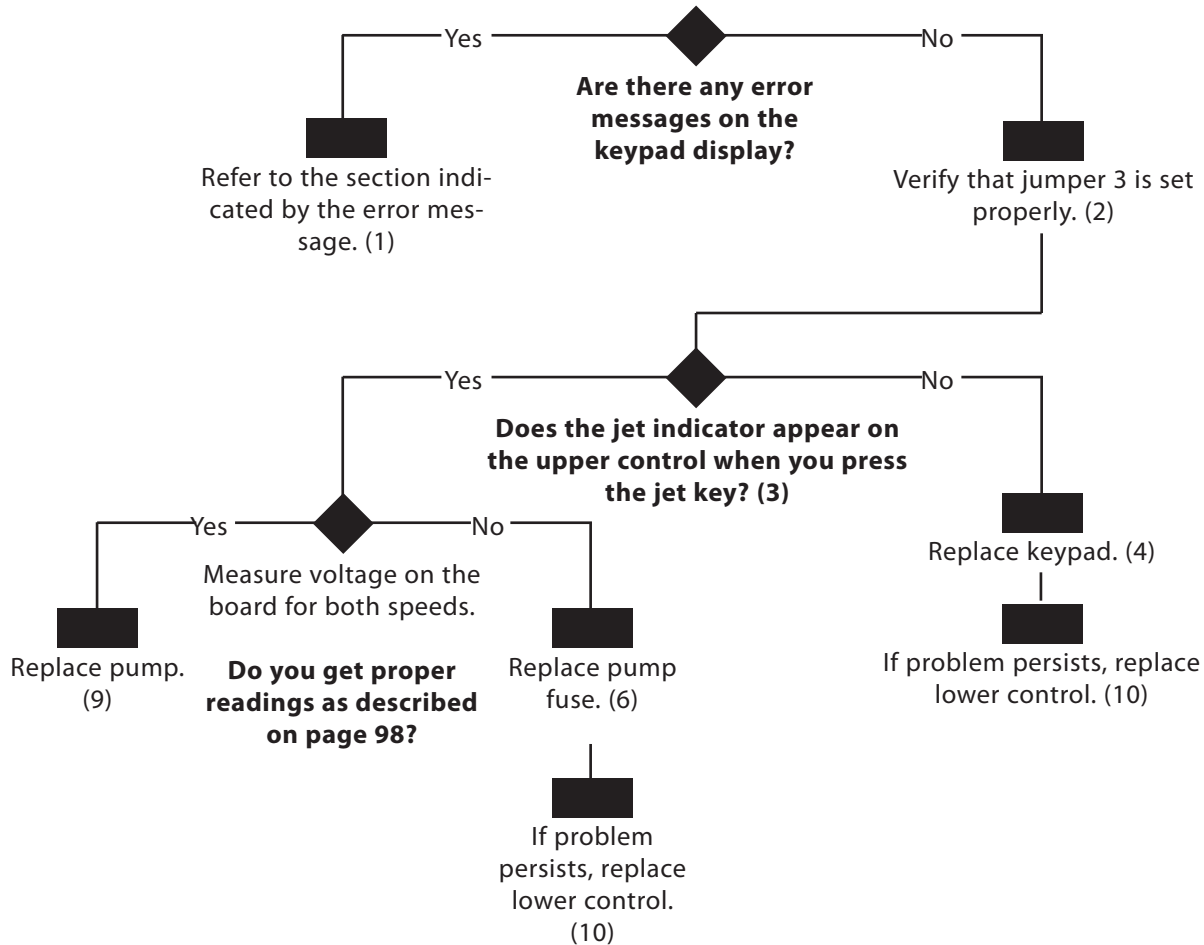
Pump 2 : P11 & P9

8) If voltage is good, replace the pump.

9) If voltage is not good, replace the lower control.

# Jet Pump Does Not Work

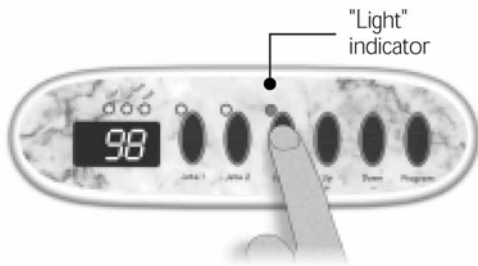
If a pump is not working, follow this troubleshooting flow chart to identify and resolve the problem:



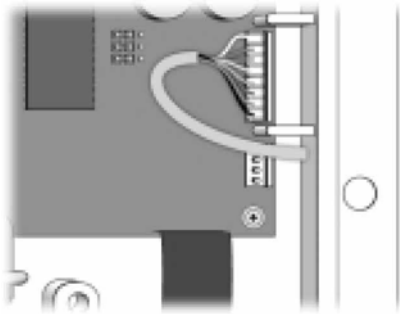
# Spa Light Does Not Work

If a pump is not working, follow these steps to correct the problem:

**It is important to measure voltage when the light is connected to the pack. Power must remain on.**

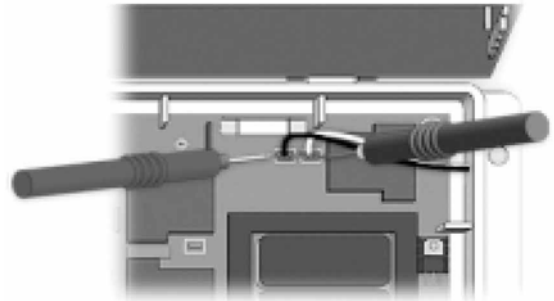


1) Verify that the light indicator appears on the upper control when you press the light key.

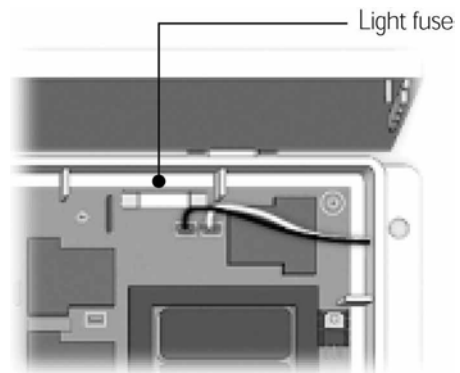


2) If the light indicator does not appear, test the system with a spare upper control.

If it works, replace the upper control.  
If not, replace the lower control.



3) If the light indicator appears but the light still does not work, measure the voltage between the two light wires on the board.



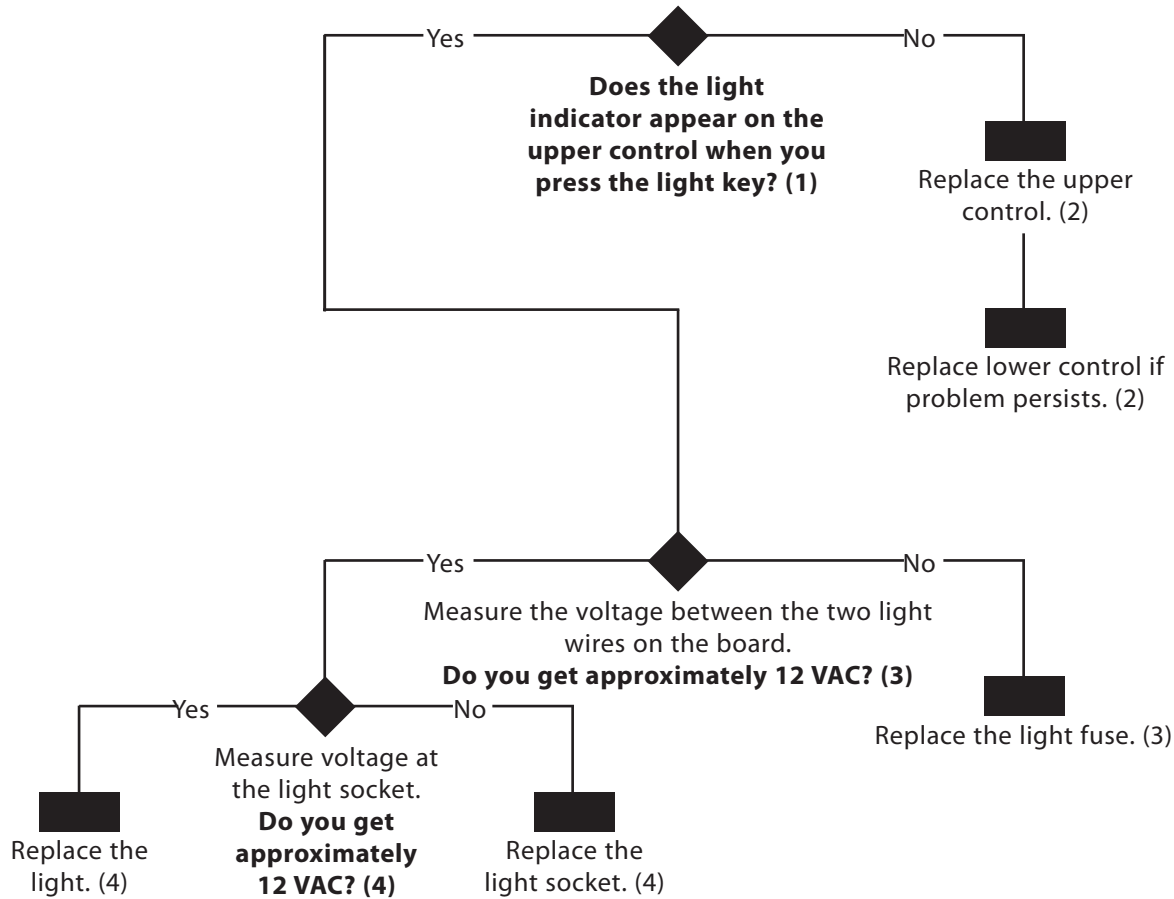
If you get 12 VAC, proceed to step 4.  
If you do not, replace the light fuse.

4) Measure voltage at the light socket.

If you get 12 VAC at the socket, replace the light.  
If you do not get 12 VAC at the socket, check the light fuse on the board and replace if necessary. If the fuse is good, replace the light socket.

# Spa Light Flow Chart

If the spa light is not working, follow this troubleshooting flow chart to identify and resolve the problem:





# Ozonator Does Not Work

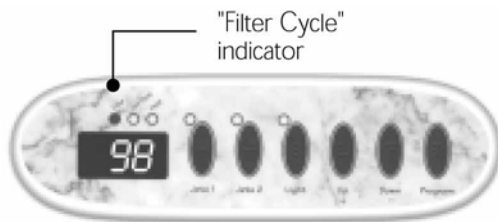
If the ozonator is not working, follow these steps to correct the problem:

**It is important to measure voltage when the ozonator is connected to the pack. Power must remain on.**

To increase the life of the relay, Dimension One uses a “snubber” circuit on the ozonator relay. With this type of circuit, if no ozonator is connected to an output and the relays are open, the voltmeter will still get a reading of around 230 VAC. This is normal.

Note that the ozonator output will shut down when a pump or blower is turned on manually.

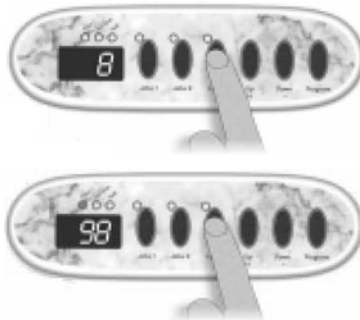
For “P” connections, please refer to the wiring diagram on the inside of the pack cover.



1) Check if filter cycle indicator appears on the upper control.

2) If icon does not appear, press and hold the light key for 5 seconds. The display will show a value that represents the filter cycle duration in hours.

Press the light key again to start a filter cycle.



3) Measure the voltage between the ozonator's brown and white connectors. You should get 230 VAC.

4) Replace the ozonator if the voltage is good.

5) If voltage is not good, check if pump 1 or the circulation pump is working.

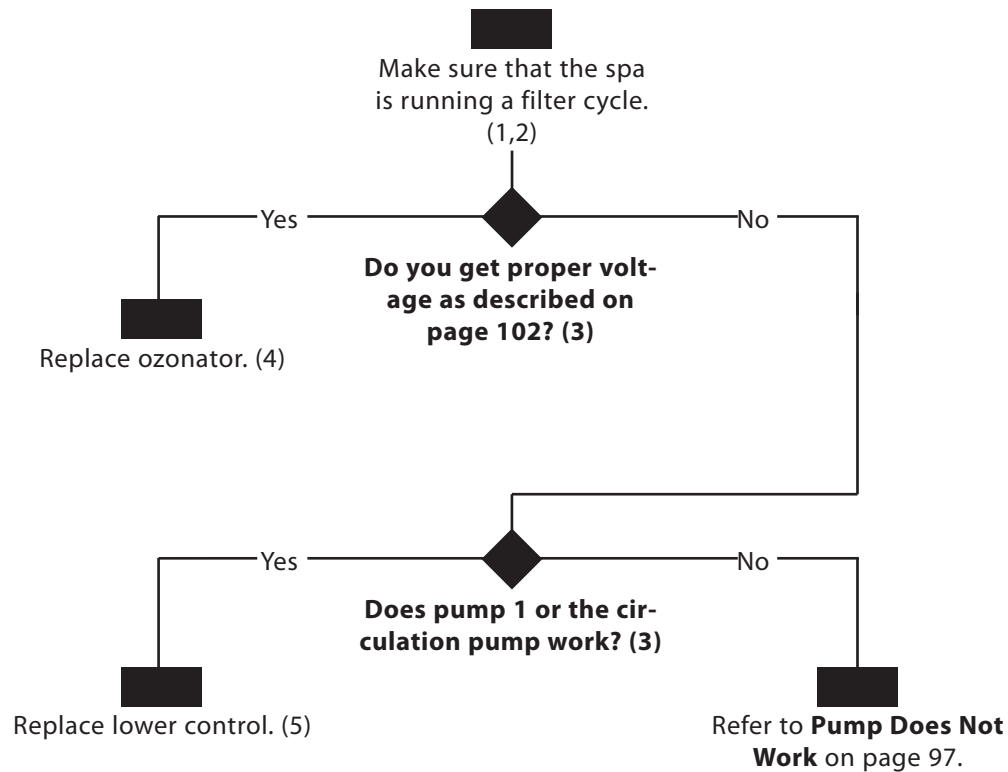
If either pump works, replace the lower control.

If neither pump works, refer to **Pump Does Not Work** on page 97.

# Ozonator Flow Chart

If the ozonator is not working, follow this troubleshooting flow chart to identify and resolve the problem:

**Ozonator output will be shut down when any pump is turned on manually.**



# Replacing the Spa Pack

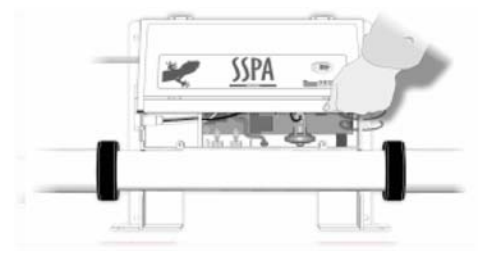
When replacing an SSPA pack, it is important to make sure to turn the power off before proceeding.



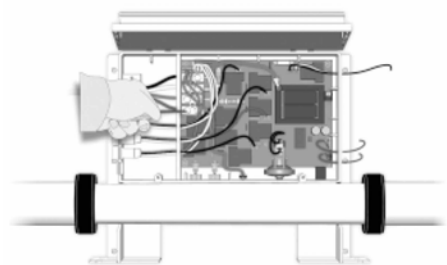
1) Unplug the pump and ozonator connectors.



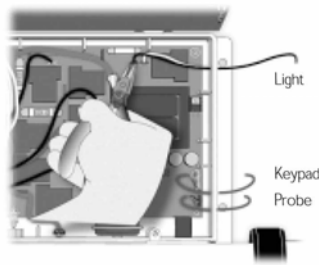
2) Remove the two screws from the front pack cover and the mounting screws at the pack's base.



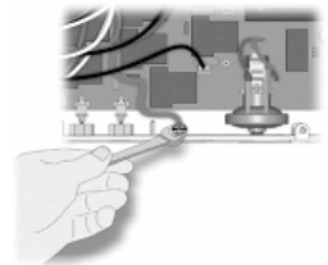
3) Lift the spa pack cover.



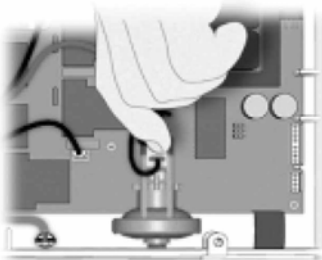
4) Disconnect power input cables.



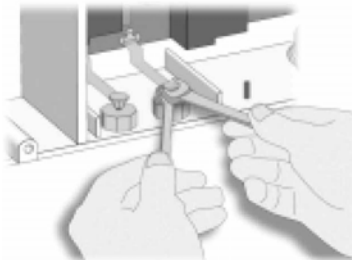
5) Disconnect light cables, keypad and temperature probe connectors.



6) Disconnect pressure switch cable.



7) Disconnect heater ground cable.



8) With wrenches, free the board blades by removing the two heater nuts.



9) Slide the pack out of the heater barrel.

10) Check if high limit sensor is properly in place in its slot and slide new pack into position.

11) Connect the heater to the board blades. It is important to hold both nuts when tightening. If you bend or twist the end of the element, you may damage it.

12) Reconnect the heater ground cable and pressure switch cables.

13) Reconnect light cables, keypad and temperature probe.

14) Plug in pump and ozonator connectors.

15) Reconnect power input cables.

16) Close pack cover.

# Adjusting the Pressure Switch



When a voltmeter is available:

1) Set voltmeter to ohms. While both probes are touching one another, the voltmeter should beep to show there is continuity.

2) Turn pump 1 off.

3) Check for continuity in the pressure switch.

If you have no continuity, go to step 4.

If you have continuity, increase the pressure switch setting by turning clockwise until voltmeter stops beeping. Then decrease the setting 1/4 turn.

4) Turn pump 1 on in low speed. Allow it to run for a few minutes.

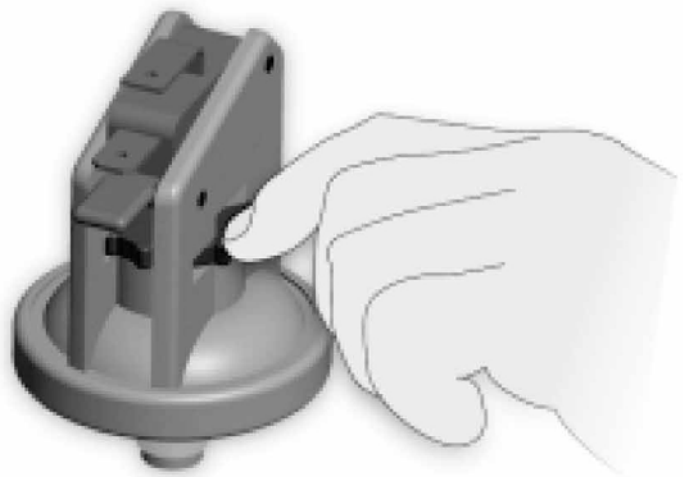
If an FLO error does not appear, you have adjusted the switch successfully.

If an FLO error appears, decrease the pressure switch setting by turning counter-clockwise until voltmeter starts beeping. Then decrease another 1/4 turn. Turn the pump off.

FLC should not appear. Restart procedure if FLC appears.

5) When adjustment procedure is completed, apply Loctite 425 to the adjustment screw to secure it in place.

When a voltmeter is not available:



1) Turn pump 1 off.

2) Decrease the pressure switch setting to 0.5 PSI or until FLC message is displayed.

3) Start increasing the pressure switch setting by very slowly turning adjustment screw counter clockwise until FLC message disappears. Then, decrease the setting 1/4 turn.

4) Turn pump on at high speed for 30 seconds; there should be no FLO message.

5) Turn pump off and wait 30 seconds. There should be no FLC message. If you see an FLO or FLC message, restart the adjustment procedure.

If you are not able to adjust the pressure switch, replace it.



## AFS\* Troubleshooting Table of Contents

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\* Please note that this only applies to AFS models prior to 2008.  
Later models use Bay Pack with D15 -CE PC Board.

# Control Panel Troubleshooting

## ERROR CODES

The LX-15 system is a self-diagnostic control system. The system will automatically display an alphanumeric symbol if a problem is detected.

### **SN1 - NONFUNCTIONAL HIGH TEMPERATURE SENSOR**

This must be repaired or replaced by the dealer or a qualified service technician.

### **SN2 - NONFUNCTIONAL TEMPERATURE SENSOR**

This must be repaired or replaced by the dealer or a qualified service technician.

### **FL1 - WATER FLOW PROBLEM**

The pressure switch is not closed when the pump is activated. The heater is deactivated. Proper flow of water is inhibited or the pressure switch has malfunctioned. Check for proper water level. Check that the pump is primed. Confirm that the filters are not clogged. The pressure switch may need to be adjusted. Contact a dealer or a qualified service technician.

### **FL2 - PRESSURE SWITCH PROBLEM**

The pressure switch is closed while the pump is deactivated. The pressure switch may need to be adjusted. Contact a dealer or a qualified service technician.

### **COL - COOL CONDITION**

If the water temperature drops 11°C below the set temperature, the low speed pump and the heater will activate to bring the water temperature within 8°C of the set temperature. No corrective action is required.

### **ICE - FREEZE CONDITION**

A potential freeze condition has been detected 12.8°C. No action is required. The pump will turn on in low speed; the heater will also activate. The spa will automatically bring the water temperature back up until the risk of damage is minimized.

### **OH - HIGH TEMPERATURE CONDITION**

Spa water temperature is above acceptable limits. **DO NOT ENTER THE SPA!** Water temperature has reached 43.3°C. The low speed pump is activated to assist in lowering water temperature.

### **--- - WATCHDOG**

Water temperature has reached 48°C. The entire system is disabled. Contact a dealer or a qualified service technician.

# Other Control Panel Functions

## SET TEMPERATURE

The default display is the actual water temperature. While the actual water temperature is being displayed, pressing **WARMER** or **COOLER** once displays the set temperature; pressing either button again within three seconds will cause the set temperature to increase or decrease by one degree. If no buttons have been pressed for three seconds, the display will default to the actual water temperature.

Important notice : after electrical network shut down, temperature setting will go to its default setting at 38°C.

## JETS 1

Press the **Jets 1** button once to turn pump 1 on in low speed. Press the button again to switch the pump into high speed. Press the button once more to turn off the pump. The pump will shut off after 20 minutes of operation unless the spa is running a filter cycle.

## JETS 2 & 3

Press the **Jets 2** or **Jets 3** button to turn on the corresponding pump in high speed. Press the button again to turn the pump off. The pump will shut off after 20 minutes of operation.

## LIGHT

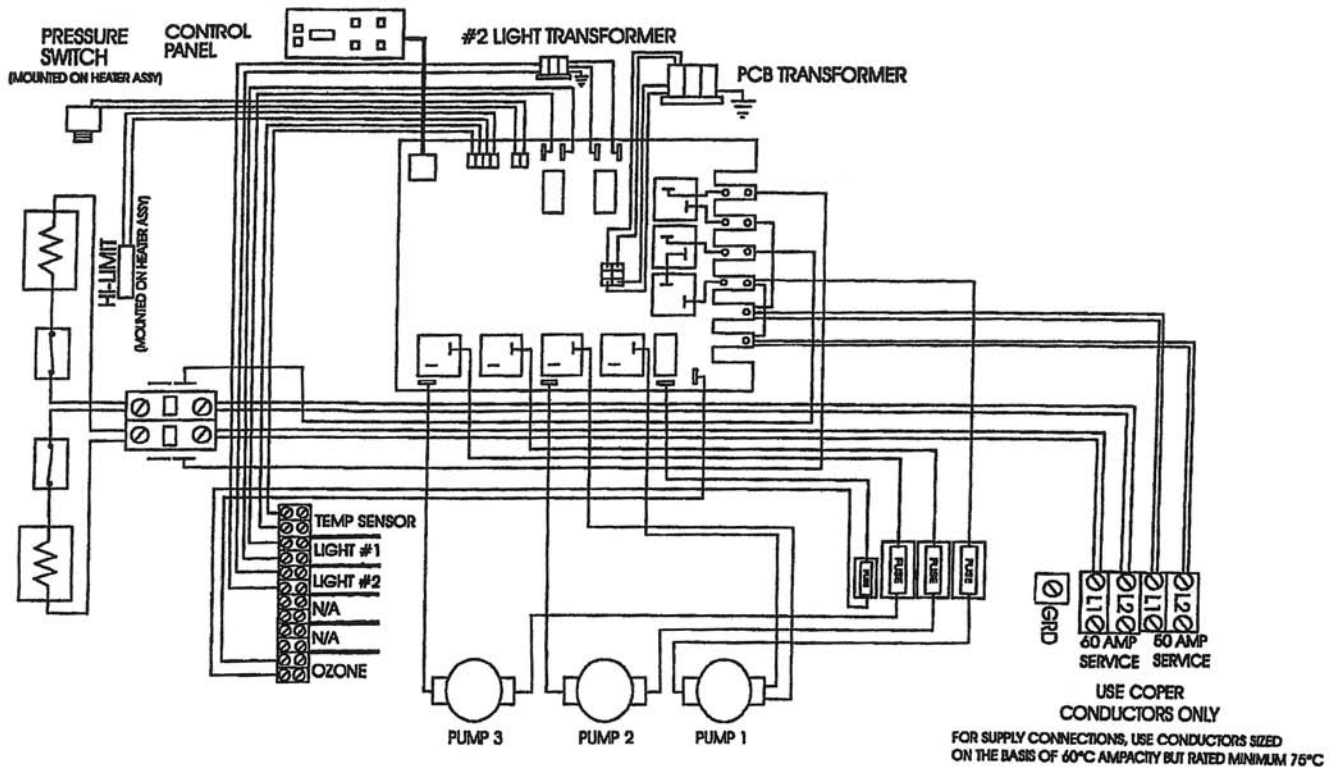
Press the **Light** button to turn the spa light on. Press it again to turn the light off. The light will shut off after one hour.

## ECONOMY MODE AND STANDARD MODE

When the spa is in economy mode, the heater will only turn on automatically during a filter cycle. In standard mode, the spa will turn on the low speed pump and the heater automatically in order to maintain the water temperature within 3° of the set point. When the set point is reached, the heater will turn off, followed by the low speed pump 30 seconds later. The filter cycles will proceed as programmed; the heater will turn on automatically if the thermostat allows it.



# Wiring Diagram - LX-15



## ELECTRICAL REQUIREMENTS

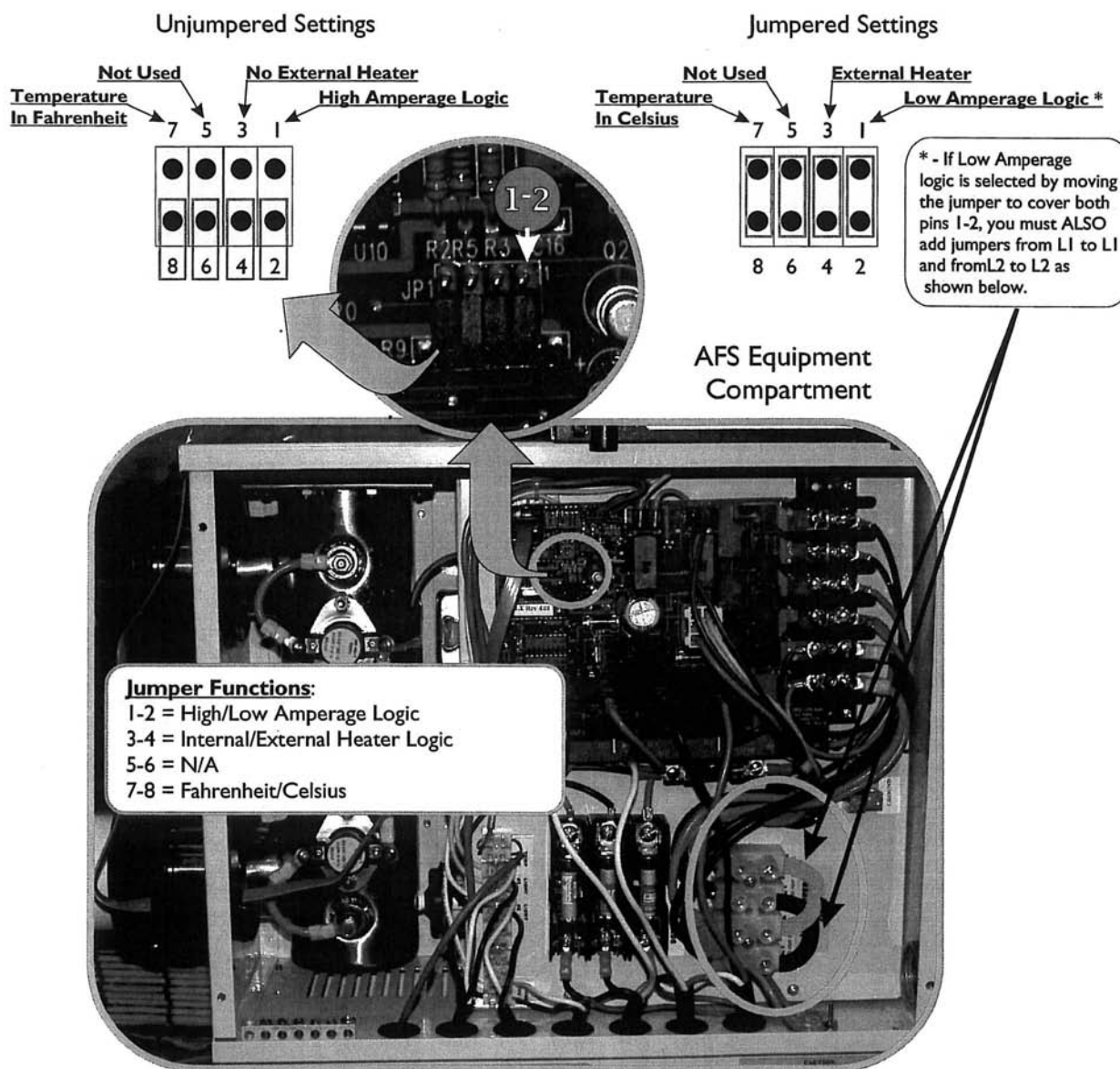
This control system requires two independent services. The first service will run approximately 48 amps. This requires a 60 amp service. The second service has three jet pumps; it will run approximately 40 amps maximum load. This requires a 50 amp service.

# LX-15 Jumper Settings

## Aquatic Fitness Systems Jumper Settings

### Dealer Jumper Instructions For SpaBuilder LX15 Series Board - Jumper JP1

Changing the jumpers to cover both pins will produce the Alternate Settings functions..



# Nothing Works

Something to remember: When a system fails, there is probably one, and only one problem. When nothing works, verify that the spa has power by observing the upper control. The upper control display will always be displaying something as long as the spa has power. The upper control can display one error code which will deactivate the spa (---).

## STANDARD TROUBLESHOOTING APPROACH

- 1) Check for proper power to the spa.
- 2) Is the display showing "---" error?
- 3) Check all fuses for continuity (out of circuit).
- 4) Check the voltage at the secondary side of the transformer (6 pin molex connector at J\$, yellow-yellow).
- 5) If no voltages are good, replace the transformer.
- 6) Replace the control panel.
- 7) Replace the circuit board.

## PRELIMINARY SETUP AND OBSERVATIONS

### FIRST STEPS

- 1) Look at the upper control display for any error codes.
- 2) Put the control in standard mode. Set the temperature higher than the present water temperature to force a heat call. If the spa goes into standard mode and the temperature setting was successfully changed, go to step 4.
- 3) If the upper control does not work and voltage to the spa is good, turn the spa off and connect a spare control. If the spare control works, replace the defective control. If the spare does not work, replace the circuit board.
- 4) If the " \_ \_ \_ " error message appears on the upper control, turn off the spa at the house breaker and install a replacement high limit / temp sensor plug. The sensors do not actually have to be installed in the plumbing to perform this test, just at the PC board. Turn the spa on. Return to standard mode, increase the set temperature to force a heat call. If the " \_ \_ \_ " message is gone, complete the installation of the temp / high limit sensors.
- 5) If no error message appears on the upper control, the upper control and the board are communicating. Gather voltage and temperature data and thoroughly check each of the spa's functions for proper operation.
  - a) If the spa is in the middle of a filter cycle, manually turn the pump off.
  - b) Put the spa in standard mode and turn up the thermostat. Observe: pump turns on at low speed and heater on icon lights up. If the control panel does not work and voltage to the spa is good, turn the spa off and connect a spare control. If the spare control works, replace the defective control. If the spare does not work, replace the circuit board.
  - c) Check all other spa functions from the panel.

# No Heat or Not Enough Heat

Go through **First Steps**. Any heat problems should show up in a thorough check of all spa functions. The most common are described below.

## **PUMP TURNING AND PANEL INDICATES HEAT, BUT THERE IS NO HEAT**

- 1) If you have not, go through **First Steps**.
- 2) Be sure the spa is in the standard mode and the temperature is set high enough to make a heat call.
- 3) Check for voltage at the heater load terminals (finger 4-6). If there is no voltage, replace the circuit board.
- 4) Check for voltage at the heater. If there is no voltage, replace the heater wires.
- 5) Check for a current through the heater using a clamp-on ammeter. If there is no current, replace the heater element.

## **PUMP TURNING BUT NO HEATER INDICATOR**

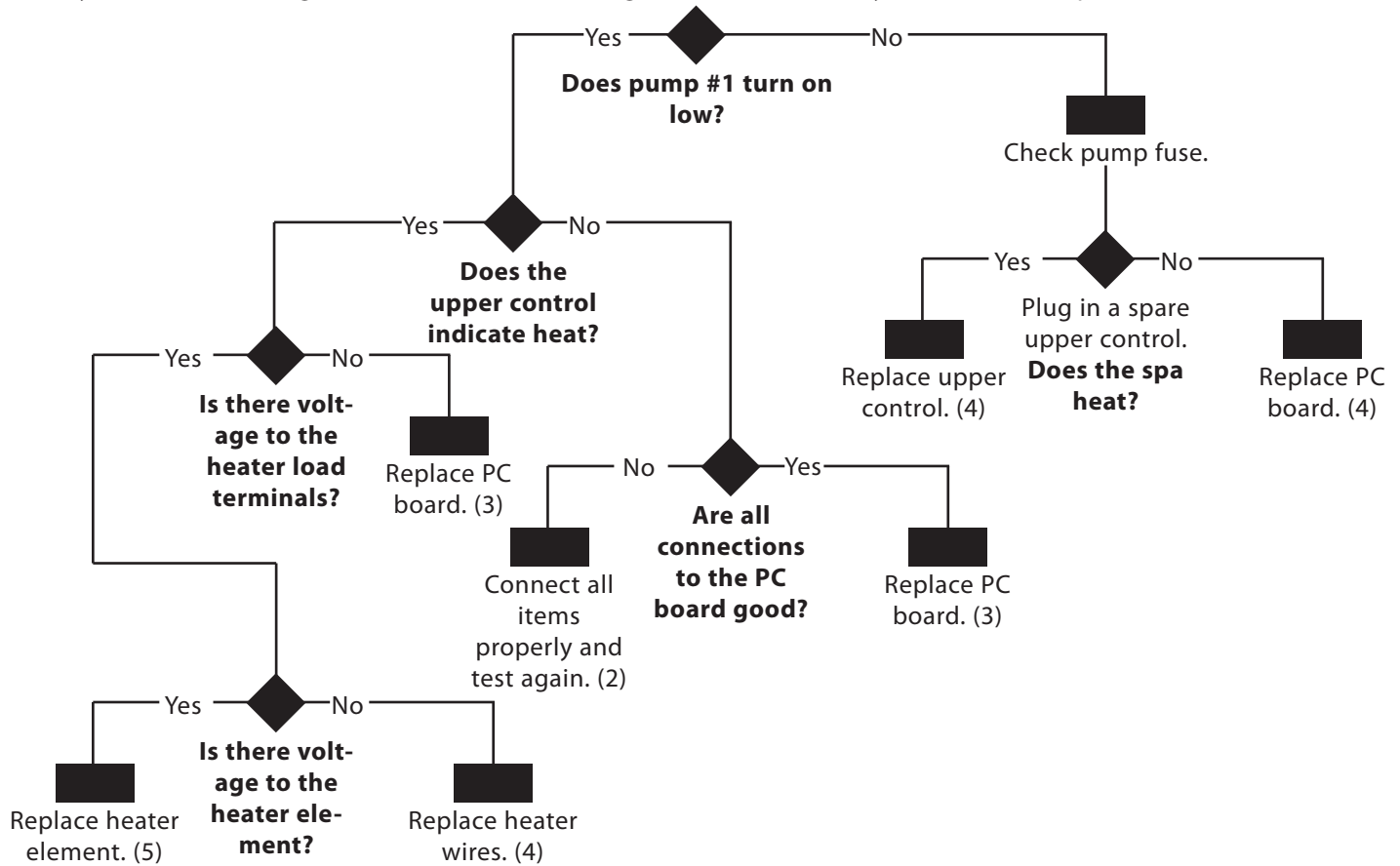
- 1) Be sure that the spa is in the standard mode and the temperature is set high enough to force a heat call.
- 2) If the heater on icon does not appear, turn off the power to the spa. Check all the connections to the circuit board. Turn the power on.
- 3) If the connections are OK but there is still a problem, replace the circuit board.

## **PUMP NOT TURNING AND NO HEATER INDICATOR**

- 1) Check the voltage to the spa.
- 2) Be sure that the spa is in the standard mode and the temperature is set high enough to force a heat call.
- 3) Check for supply voltage between the white and black wires at the pump 1 receptacle.
- 4) If no voltage, plug in spare panel. If the spare panel works, replace the panel. If it does not work, replace the circuit board.

# No Heat Flow Chart

If the system is not heating, follow this troubleshooting flow chart to identify and resolve the problem:



# Intermittent Heating

If the spa is heating intermittently, follow these steps to identify and resolve the problem:

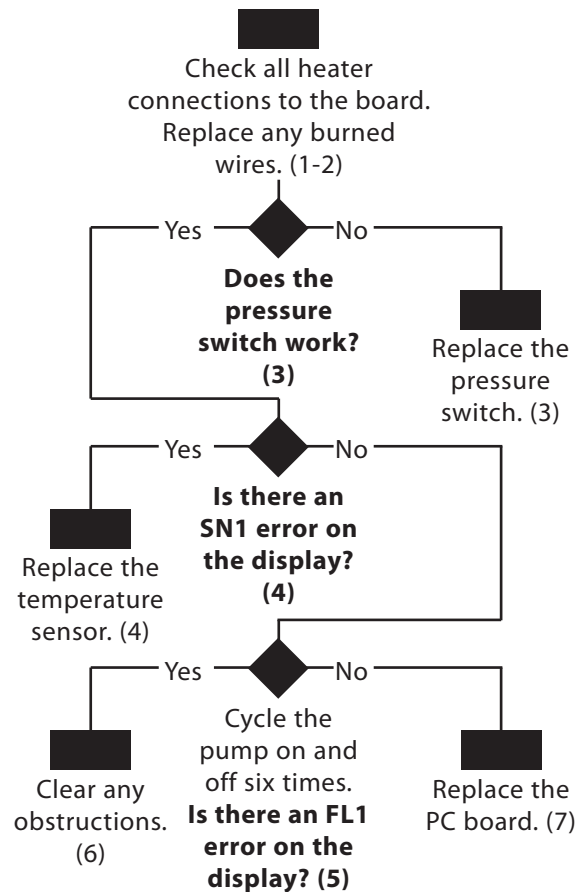
- 1) Check the crimped connections to the heater element. If they are burned, replace the wires. Check that the connections on the board are good.
- 2) Check the heater load connections (fingers 4-6) at the PC board. If possible, clean and renew the connections. If the relay is physically burned at the connections, replace the PC board.
- 3) Check the pressure switch for proper and consistent mechanical operation. If the switch does not work properly, replace it.
- 4) If the display shows an SN1 error, replace the temperature sensor.
- 5) Cycle the low speed pump on and off six times. If an FL1 error appears, go to step 6. If not, go to step 7.

**NOTE: Cycling the pump on and off too quickly can cause the motor to overheat. Let the pump run for a few minutes after you turn it on. The motor cools quicker when running due to the cooler air running through the pump.**

- 6) Check for a partial water flow obstruction by unscrewing the pressure switch. Turn the low speed pump on and observe the water flow out of the heater manifold. It should be a straight, steady stream. If it is not, clear the obstruction.
- 7) If there is no FL1 error, replace the PC board.

# Intermittent Heating Flow Chart

If the system is heating intermittently, follow this troubleshooting flow chart to identify and resolve the problem:



# No Jets

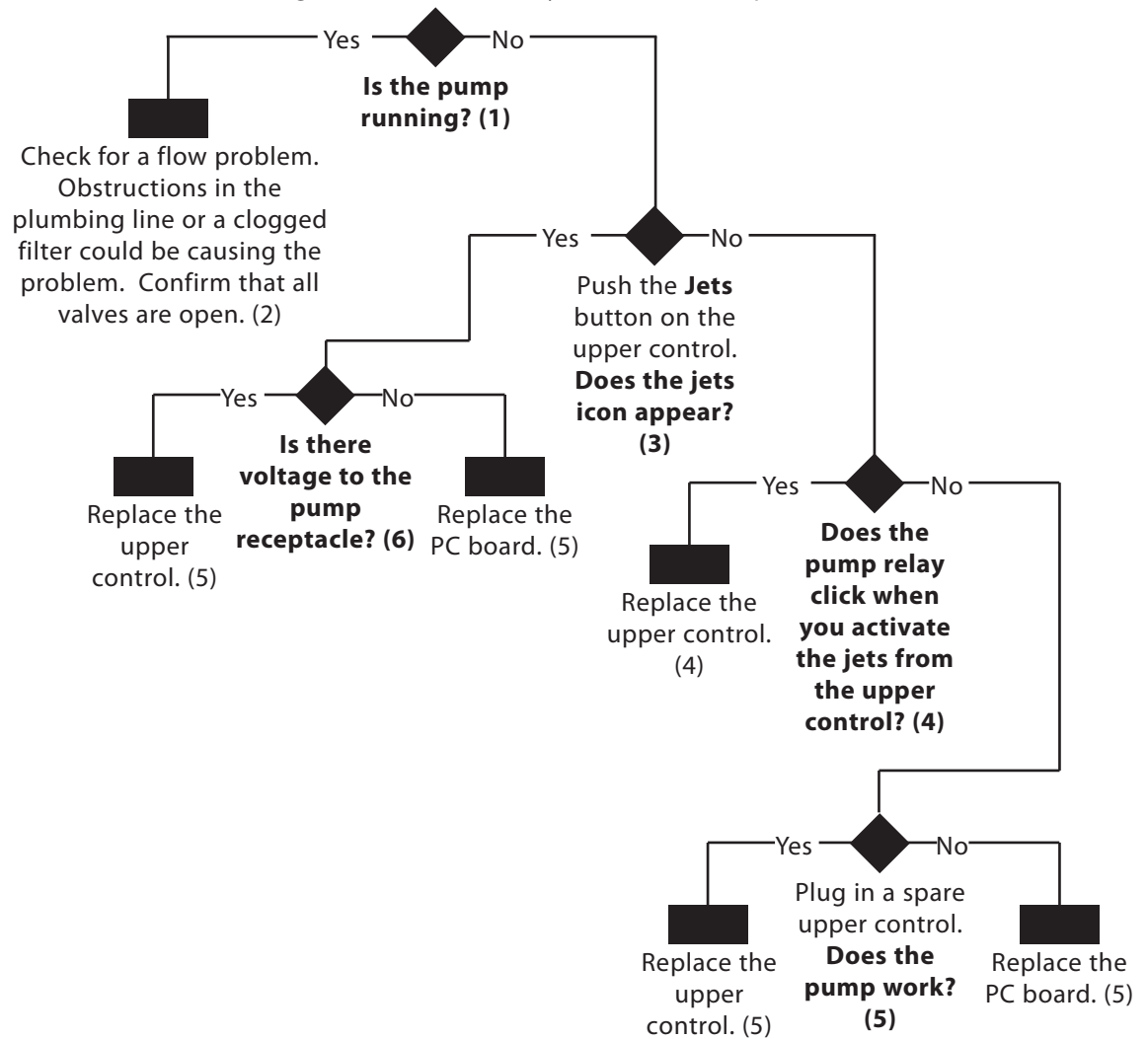
If the jets are not working, follow these steps to identify and resolve the problem:

- 1) Try to start the jet pump. If the pump is working, go to step 2. If not, go to step 3.
- 2) If the pump works, there is a flow problem. Make sure the valves are open. Check for a clogged filter or an obstruction in the plumbing line.
- 3) If the pump does not work, try to turn on the jets from the upper control. If the jets icon appears, go to step 6.
- 4) If the jets icon does not appear, observe the pump relay on the circuit board. If it clicks when you push the **Jets** button on the upper control, the upper control's display is bad. Replace the upper control.
- 5) If the relay does not work, plug in a spare upper control. Push the **Jets** button to start the pump. If the pump works, replace the upper control. If the pump does not work, replace the PC board.
- 6) Measure the voltage to the pump receptacle. If there is no voltage, replace the PC board. If the voltage is good, replace the pump.



# No Jets Flow Chart

If the jets do not work, follow this troubleshooting flow chart to identify and resolve the problem:



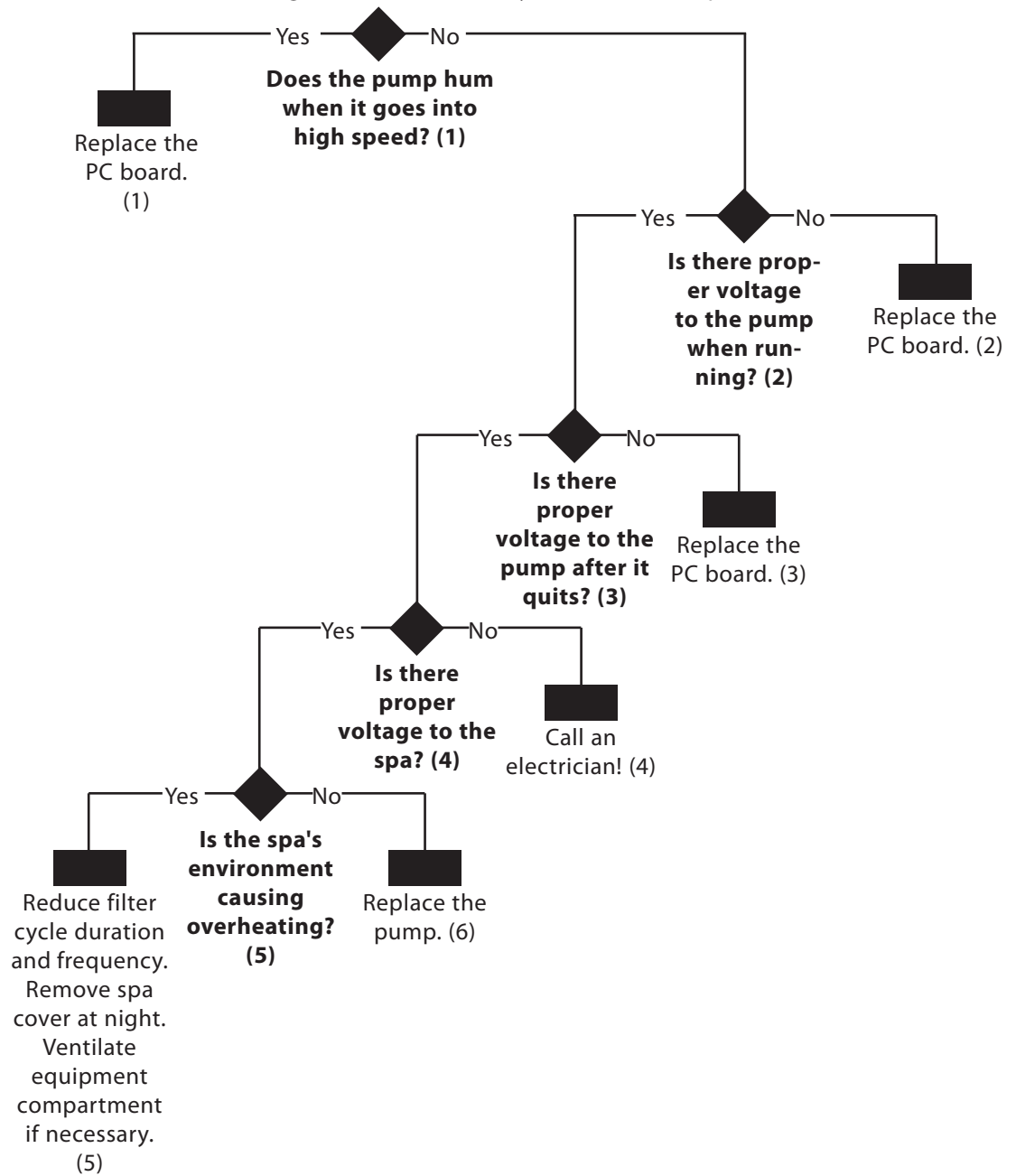
# Pump Runs and Quits

If the pump runs and quits during jet operation, follow these steps to identify and resolve the problem:

- 1) Run the pump at low speed by pressing the **Jets** button. If the pump hums when it goes into high speed, it is possible that the low speed relay is arced closed. Replace the PC board.
- 2) If the pump does not fully engage in high speed, check the voltage to the pump at the circuit board. If the voltage is too low or the points are bad, replace the PC board.
- 3) If the jets and pump quit after running normally for awhile, check the voltage to the pump at the circuit board **after the pump quits**. If there is no voltage, replace the PC board.
- 4) If the voltage to the pump is OK, check the voltage to the spa. Too much of a voltage drop causes the pump to pull too much current and overheat. Have the electric company check the voltage and current to the spa.
- 5) If the voltage and current are OK, lower the filter cycle duration. Excessive filter cycles can cause the system to overheat. If the spa is installed in a hot location, pull the cover off the spa so it does not trap too much heat. If these measures do not work, ventilate the equipment bay.
- 6) If there is no overheating problem but the motor still cuts out, replace the pump.

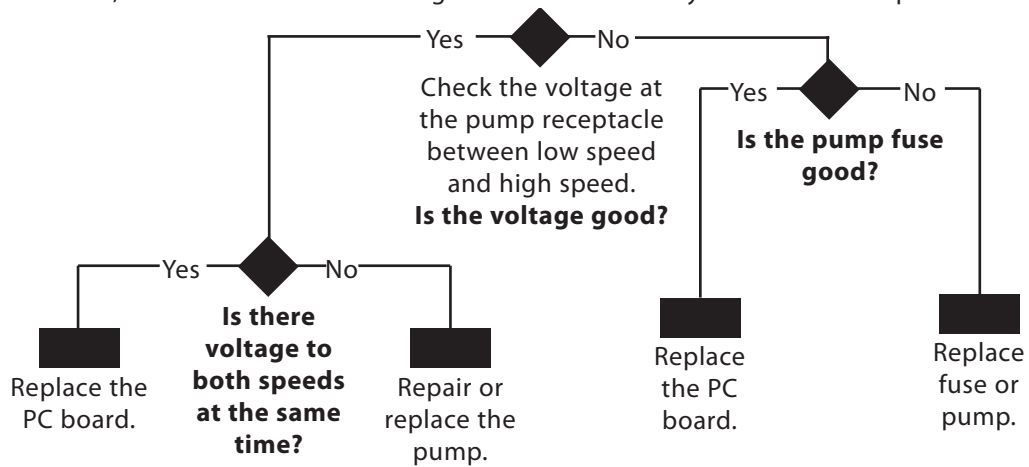
# Pump Quits Flow Chart

If pump #1 runs and quits, follow this troubleshooting flow chart to identify and resolve the problem:



# Pump Will Not Start Flow Chart

If the pump will not start, follow this troubleshooting flow chart to identify and resolve the problem:



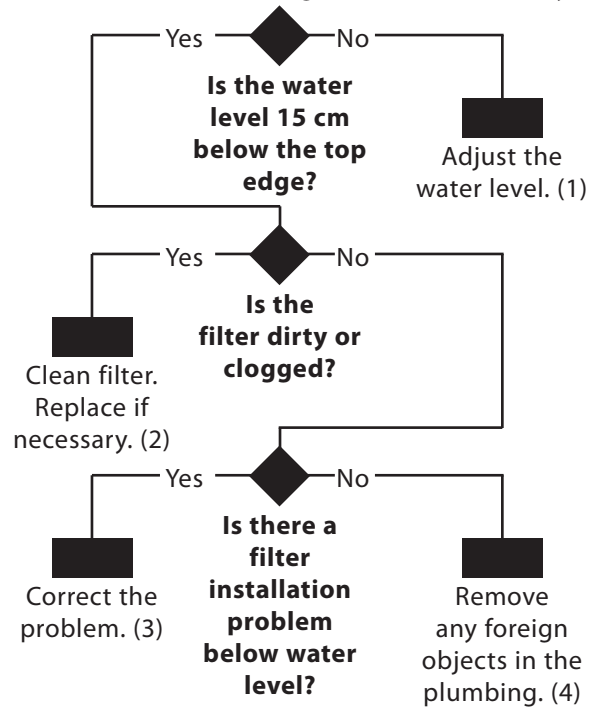
## Weak or Surging Jets

If the jets surge or jet action is weak, follow these steps to identify and resolve the problem:

- 1) Ensure that the water level is within the acceptable range.
- 2) Check for a clogged or dirty filter. Clean or replace if necessary.
- 3) Check for a filter installation problem below the water level.
- 4) Check for and remove any loose foreign objects between the filter and the pump intake or trapped in the impeller.

# Weak or Surging Jets Flow Chart

If the jets surge or jet action is weak, follow this troubleshooting flow chart to identify and resolve the problem:

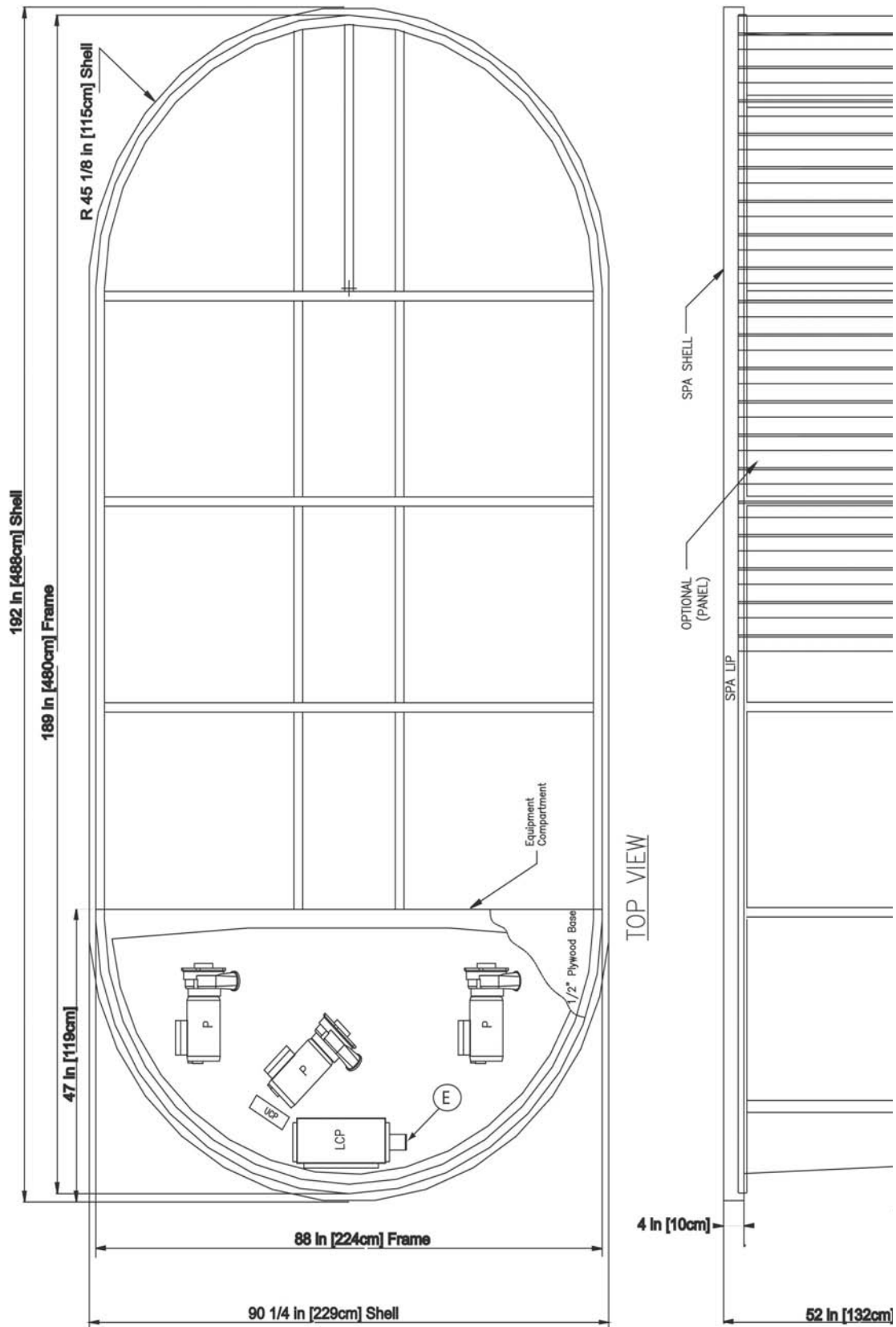


# AquaFit 16 Specifications

General	
Shape	Oval
Seating Capacity	n/a
Shell Material	DuraTex™
Dimensions	229cm X 488cm x 132cm H
Corner Radii	N/A
Water Capacity	6 440 Liters
Dry Weight	1 135 kg
Shipping Weight	1 135 kg
Full Weight	7 760 kg
Skirt Material	Wood or Synthetic optional
Water System	
Water Treatment System	CD - Ozone*
Plumbing Systems	2
Filters/Coverage	2 x 7 m2
Gate Valves	6
VCR Jet® - Air Adjustable/Directional	0
VCR Jet® - Rotator	0
VCR Jet® - Dual Rotator	0
VCR Jet® - Multi Port Spinner	0
VCR Jet® - Mini Rotator	4
VCR Jet® - Mini Directional	10
VCR Jet® - Euro Directional	0
VCR Jet® - Euro Rotator	0
VCR Jet® - Mini Directional in NFJ	0
Typhoon Jet	0
Swim Jets	6
Ozone Jet	1*
Heater Return Jet	0
Pump Returns	5
Diverter Valves	1
Floor Drains	1
Skimmer	2 - 20,3 cm Weir
Special Features	
NeckFlex® Jet Pillows	0
Headrest Pillows	1
Optimounts™	12
Tether Mount	2
Bar	1
Swim Jet Air Valves	2
Swim Tether	1
Pump Information	
Motor Size – Peak (Continuous) HP	3.6 HP
Jet Pumps # of Pumps/Speed	One / Dual & Two / Single
Circulation pump	0
Electrical System	
Voltage	230
Amperage	1x32 / 3x16 / 2x16
Heater	5.2 kW *
Thermostat	Electronic *
Light	2 Multi color LED**
Control System	Gecko Alliance*
Upper Control	Gecko Alliance*



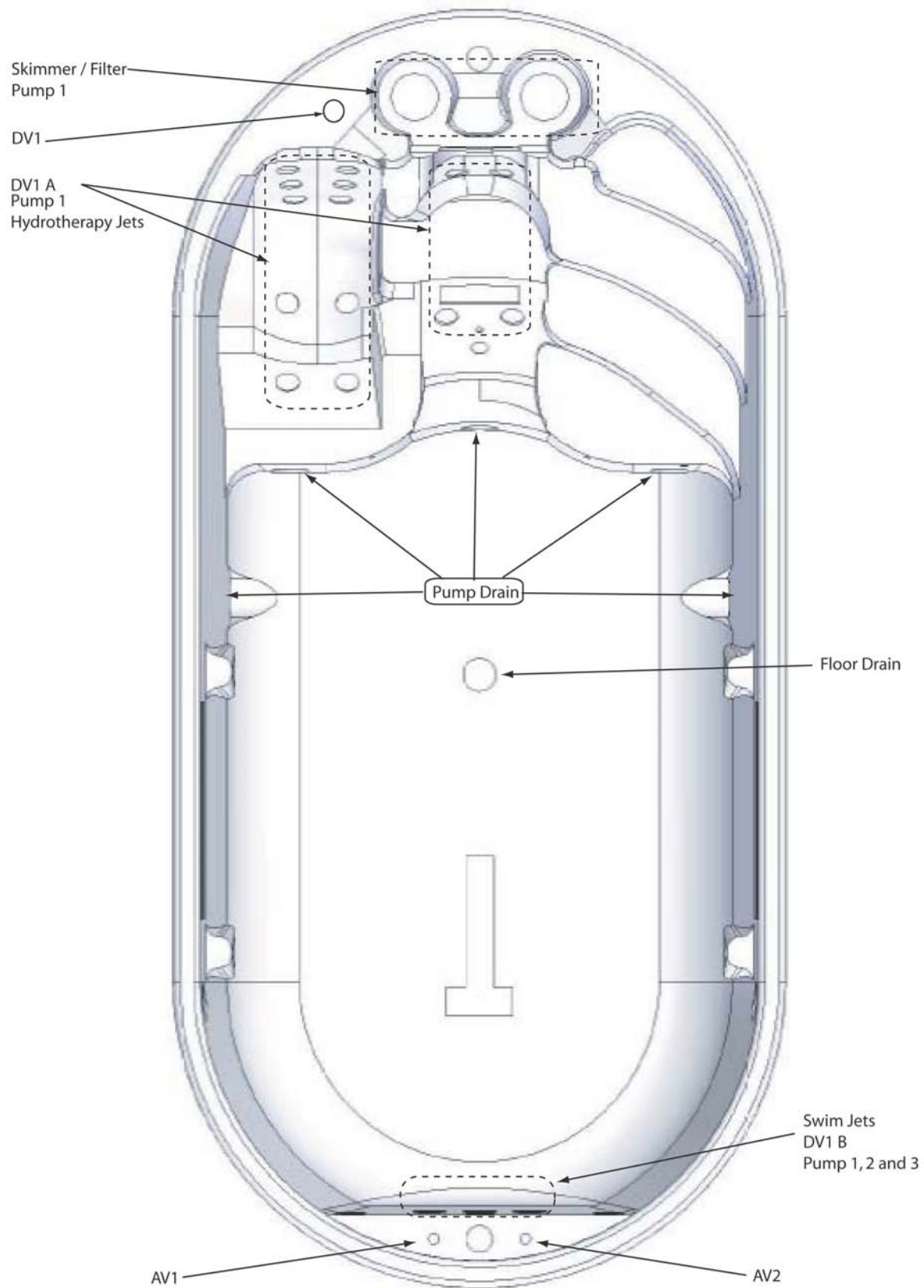
# AquaFit 16 Architectural Specification



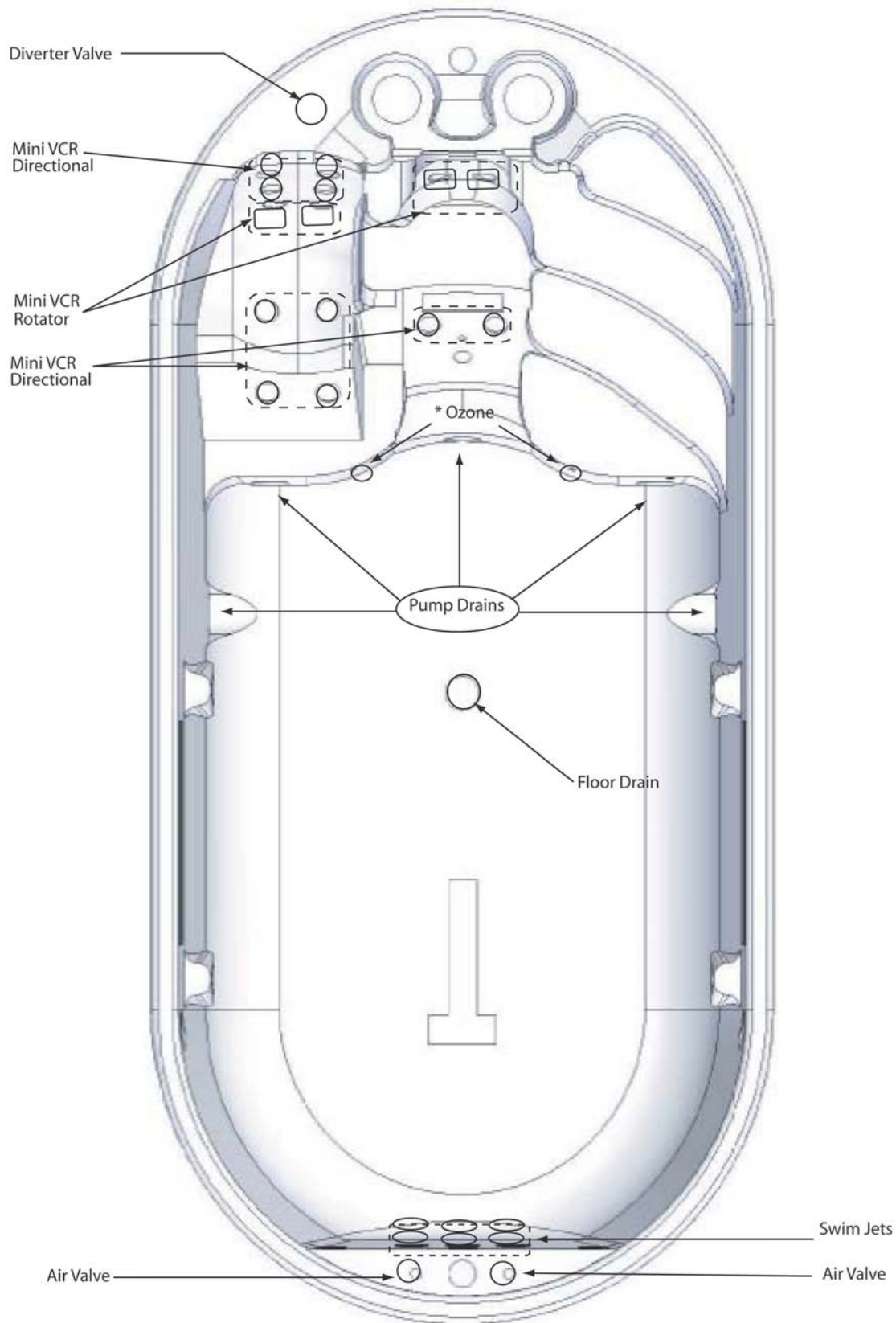
AFS must be supported over the entire base.  
Refer to D1 doc-138 for installation details.



# AquaFit 16 Plumbing Configuration



# AquaFit 16 Jet Insert Designations

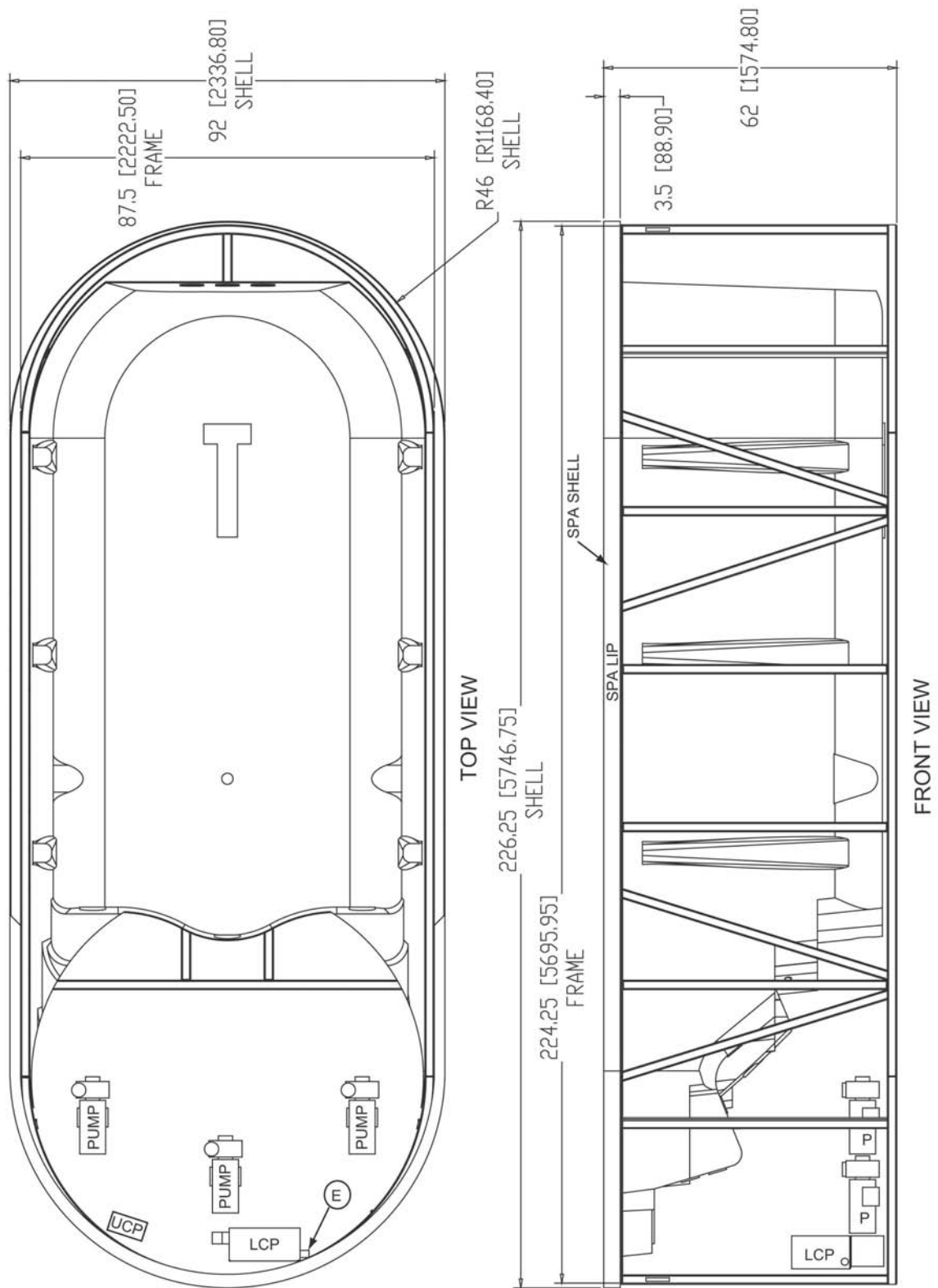


# AquaPro 19 Specifications

General	
Shape	Oval
Seating Capacity	n/a
Shell Material	DuraTex™
Dimensions	229cm X 579cm x 157cm H
Corner Radii	N/A
Water Capacity	9 085 Liters
Dry Weight	1 680 kg
Shipping Weight	1 680 kg
Full Weight	10 800 kg
Skirt Material	Wood or Synthetic optional
Water System	
Water Treatment System	CD - Ozone*
Plumbing Systems	2
Filters/Coverage	2 x 7 m2
Gate Valves	6
VCR Jet® - Air Adjustable/Directional	0
VCR Jet® - Rotator	0
VCR Jet® - Dual Rotator	0
VCR Jet® - Multi Port Spinner	0
VCR Jet® - Mini Rotator	4
VCR Jet® - Mini Directional	8
VCR Jet® - Euro Directional	0
VCR Jet® - Euro Rotator	0
VCR Jet® - Mini Directional in NFJ	4
Typhoon Jet	0
Swim Jets	6
Ozone Jet	1 *
Heater Return Jet	0
Pump Returns	5
Diverter Valves	1
Floor Drains	1
Skimmer	2 - 20.3 cm Weir
Special Features	
NeckFlex® Jet Pillows	1
Headrest Pillows	0
Optimounts™	14
Tether Mount	2
Swim Bar	1
Swim Jet Air Valves	2
Swim Tether	1
Pump Information	
Motor Size – Peak (Continuous) HP	3.6 HP
Jet Pumps # of Pumps/Speed	One / Dual & Two / Single
Circulation pump	0
Electrical System	
Voltage	230
Amperage	1x32 / 3x16 / 2x16
Heater	5.2 kW *
Thermostat	Electronic *
Light	2 Multi color LED**
Control System	Gecko Alliance *
Upper Control	Gecko Alliance *

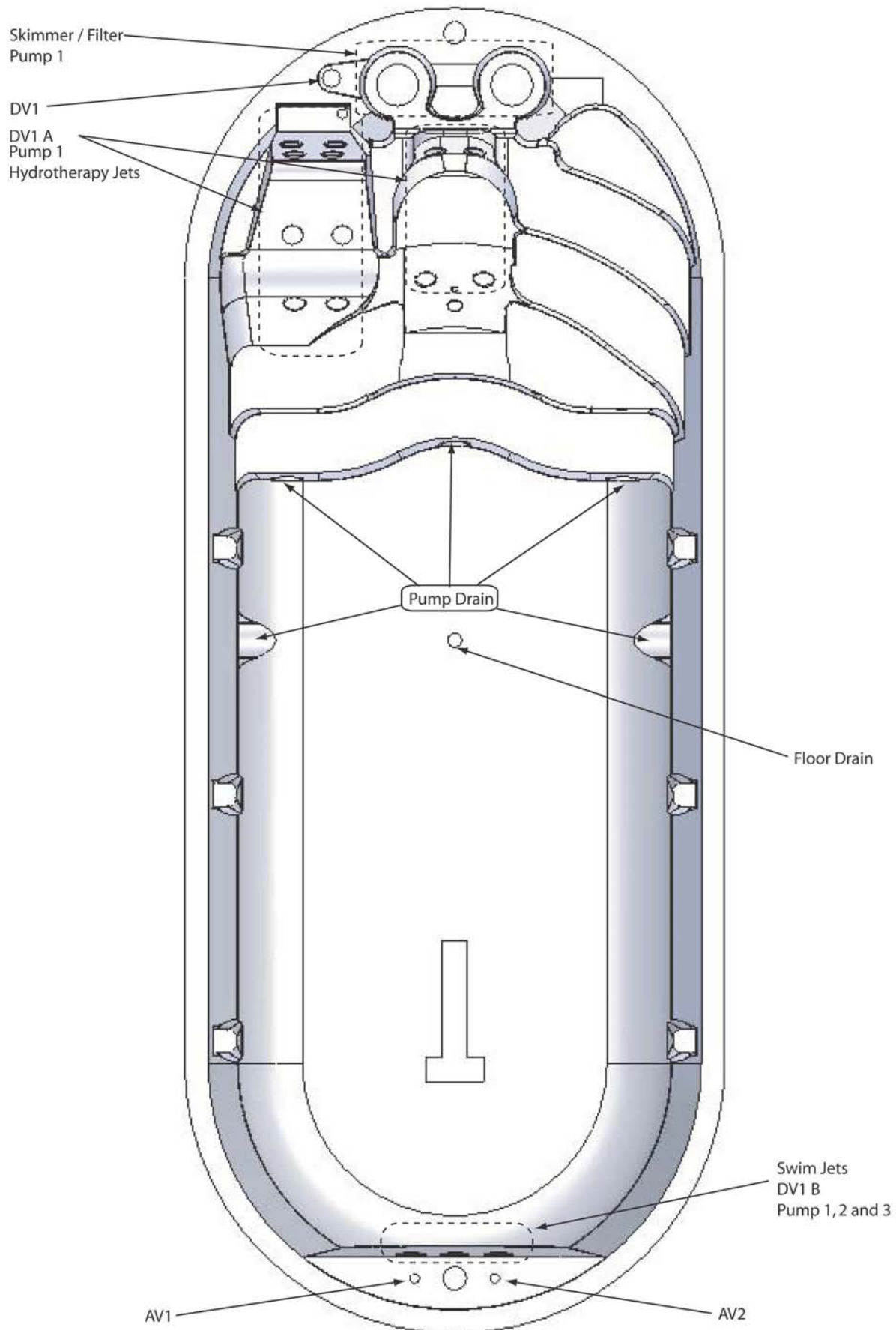


# AquaPro 19 Architectural Specification

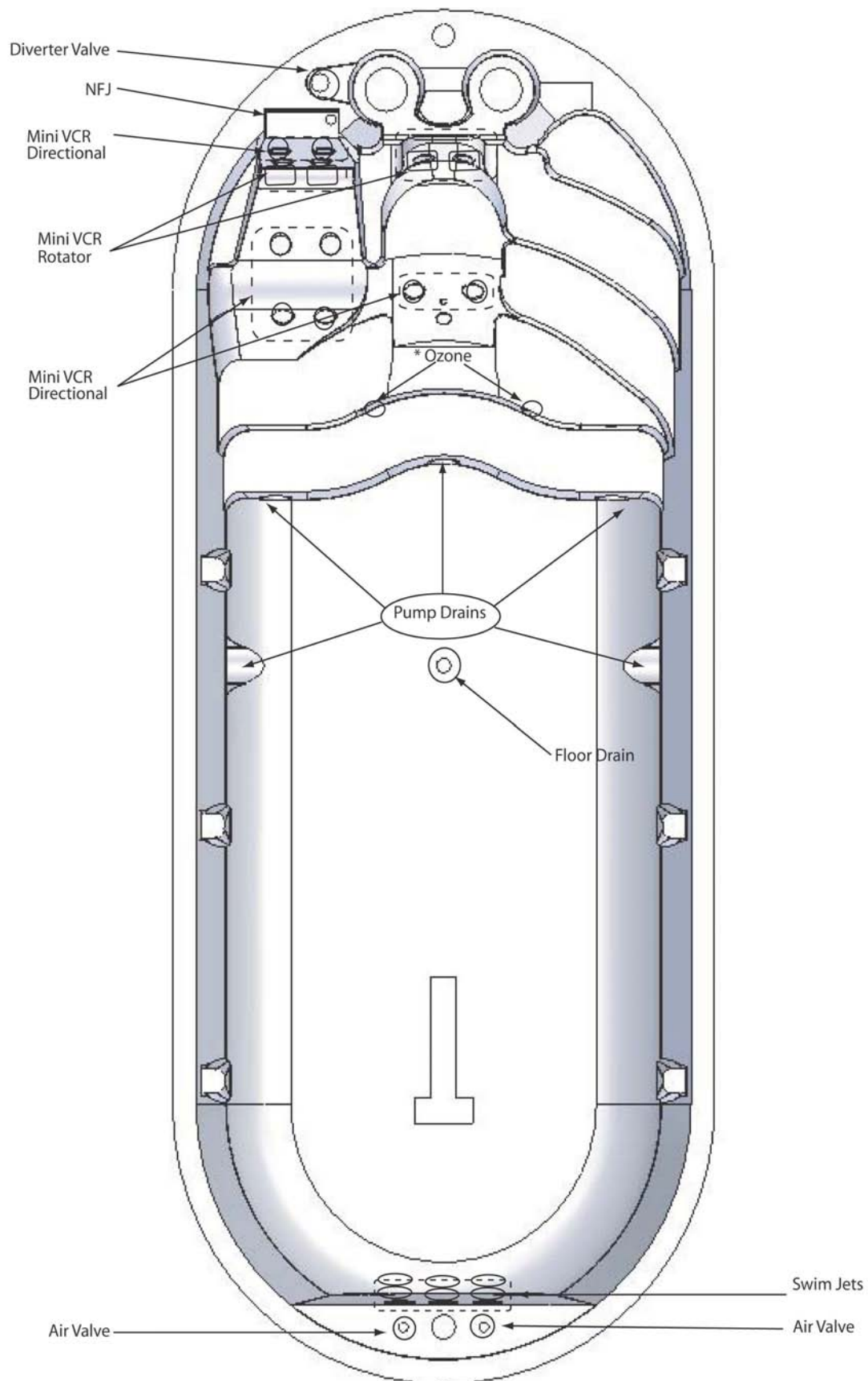


AFS must be supported over the entire base.  
Refer to D1 doc-138 for installation details.

# AquaPro 19 Plumbing Configuration



# AquaPro 19 Jet Insert Designations



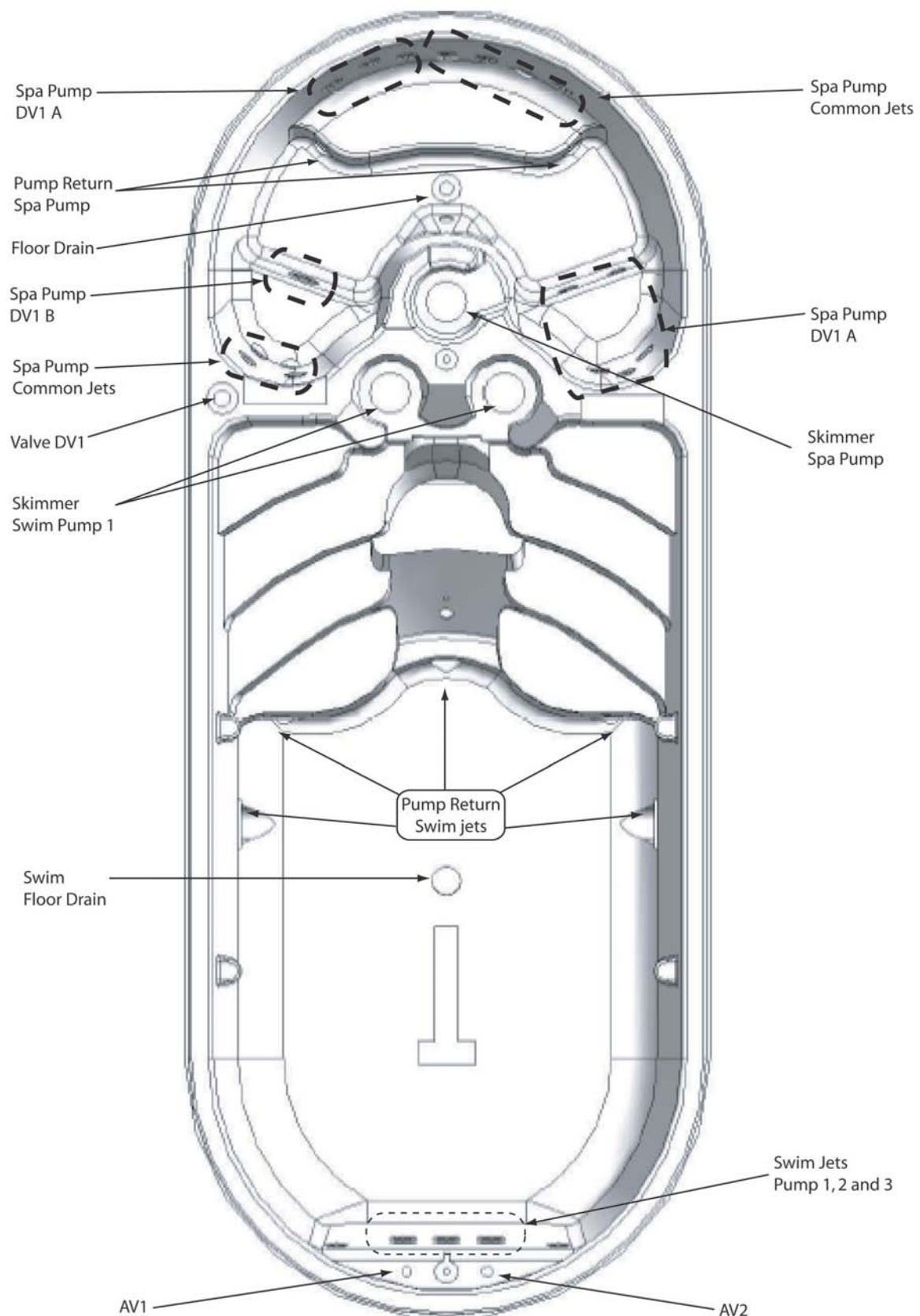


# AquaFit 19DT Specifications

General	
Shape	Oval
Seating Capacity	n/a
Shell Material	DuraTex™
Dimensions	229cm X 579cm x 132cm H
Corner Radii	N/A
Water Capacity	6550 Liters
	5490 Liters
	1060 Liters
Dry Weight	1590 kg
Shipping Weight	1590 kg
Full Weight	8200 kg
Skirt Material	Wood or Synthetic optional
Water System	
Water Treatment System	CD - Ozone (swim) / UV bulb (spa)
Plumbing Systems	4
Filters/Coverage	3 / 7 m2
Gate Valves	10
VCR Jet® - Air Adjustable/Directional	0
VCR Jet® - Rotator	0
VCR Jet® - Dual Rotator	0
VCR Jet® - Multi Port Spinner	0
VCR Jet® - Mini Rotator	8
VCR Jet® - Mini Directional	8
VCR Jet® - Euro Directional	0
VCR Jet® - Euro Rotator	0
VCR Jet® - Mini Directional in NFJ	0
Typhoon Jet	1
Swim Jets	6
Ozone Jet	2 swim, 1 spa
Heater Return Jet	1 swim, 1 spa
Pump Returns	5 swim, 2 spa
Diverter Valves	1
Floor Drains	1 swim, 1 spa
Skimmer	3 - 20,3 cmWeir
Special Features	
NeckFlex® Jet Pillows	0
Headrest Pillows	0
Optimounts™	10
Tether Mount	2
Swim Bar	1
Swim Jet Air Valves	2
Swim Tether	1
Pump Information	
Swim Motor Size – Peak (Continuous) HP	3.6HP
Swim Jet Pumps # of Pumps/Speed	One / Dual & Two / Single
Spa Motor Size – Peak (Continuous) HP	3.6 HP
Spa Jet Pumps # of Pumps/Speed	One/ Single
Circulation pump	1 spa side
Electrical System	
50Hz	
Voltage	230
Amperage - swim	3x16 / 2x16 / 1x32
Amperage - spa	3x16 / 2x16 / 1x32
Heater	5.2 kW
Thermostat	Electronic
Light	3 Multi color LED
Control System - swim	Gecko
Upper Control - swim	Gecko
Control System - spa	Gecko
Upper Control - spa	Gecko

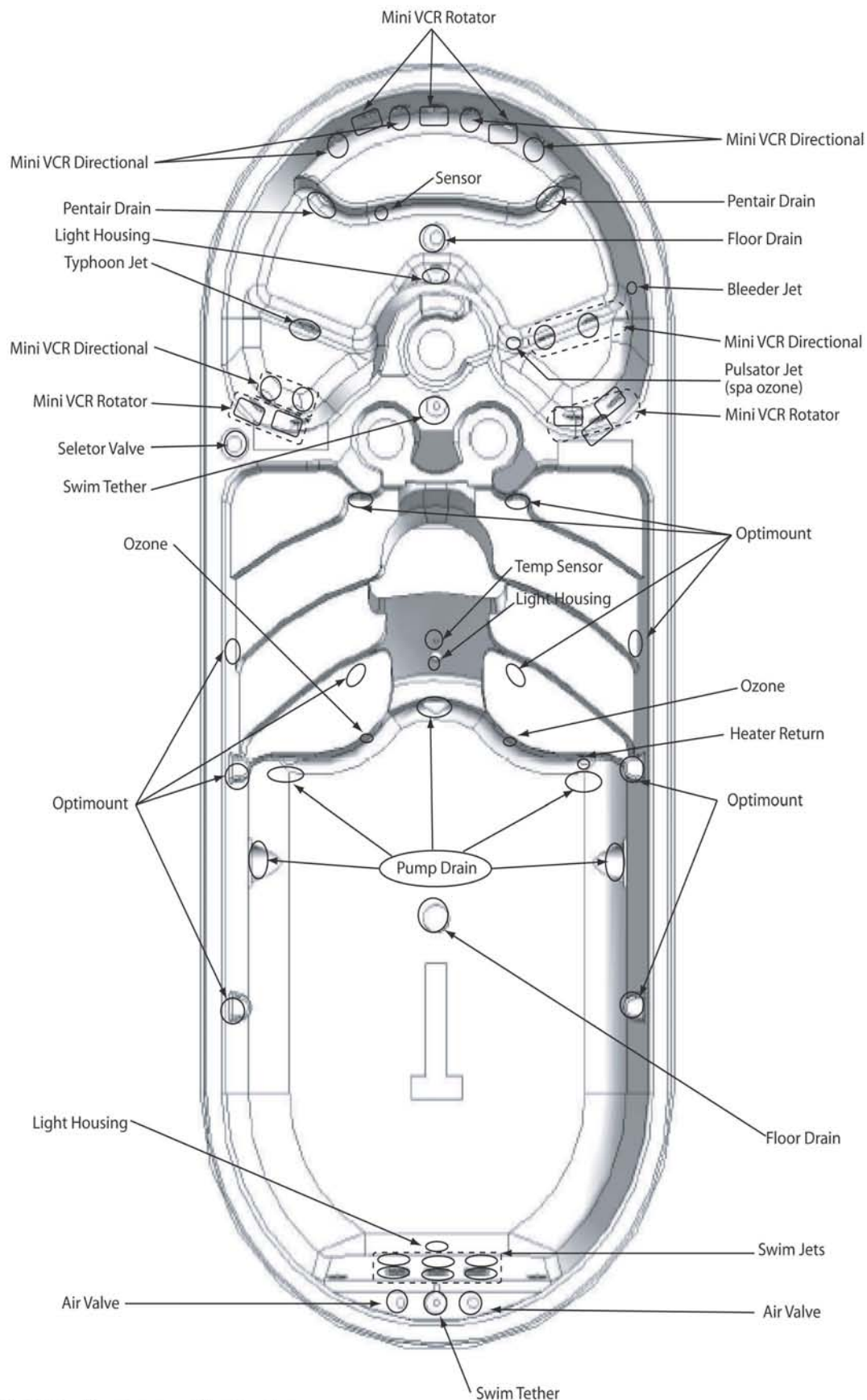


# AquaFit 19DT Plumbing Configuration





# AquaFit 19DT Jet Insert Designations



Note: 1. Subject to change without notice.